BEFORE THE BOARD OF OIL, GAS AND MINING

DEPARTMENT OF NATURAL RESOURCES

IN AND FOR THE STATE OF UTAH

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| IN THE MATTER OF THE REQUEST FOR AGENCY ACTION AND APPEAL OF DIVISION DETERMINATION TO APPROVE SIGNIFICANT REVISION TO PERMIT TO ALLOW MINING OF TANK SEAM BY CO-OP MINING COMPANY BY PETITIONERS NORTH EMERY WATER USERS ASSOCIATION, HUNTINGTON-CLEVELAND IRRIGATION COMPANY, AND CASTLE VALLEY SPECIAL SERVICES DISTRICT, CARBON COUNTY, UTAH. | DOCKET NO. 94-027<br>CAUSE NO. ACT/015/025<br><br>VOLUME II |

THURSDAY, NOVEMBER 17, 1994, COMMENCING AT THE HOUR OF 1:00 P.M. A HEARING WAS HELD IN THE ABOVE MATTER BEFORE THE BOARD OF OIL, GAS, AND MINING, 355 WEST NORTH TEMPLE, 3 TRIAD CENTER, SUITE 520, SALT LAKE CITY, UTAH 84180-1203.

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FILE NO. 111794

REPORTED BY:
LINDA J. SMURTHWAITE, CSR, RPR, CM

ORIGINAL

APPEARANCES

CHAIRMAN: DAVE LAURISKI

BOARD MEMBERS: RAYMOND MURRAY
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JAY CHRISTENSEN
KENT STRINGHAM
JUDY LEVER
THOMAS FADDIES

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THOMAS A. MITCHELL, Assistant Attorney General
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FRANK R. MATTHEWS, Petroleum Engineer
BRAD G. HILL, Geologist
RON DANIELS, Coordinator of Minerals Research

FOR PETITIONERS:
HUNTINGTON/CLEVELAND: CRAIG SMITH, ESQ.
CASTEL VALLEY: JEFF APPEL, ESQ.

FOR CO-OP MINE: MARK HANSEN, ESQ.

FOR THE DIVISION: THOMAS MITCHELL, ESQ.

I N D E X

Salt Lake City, Utah, November 17th, 1994, 1:00 p.m.

MR. LAURISKI: We can go on the record. This is the continuance in the matter of Docket Number 94-027, Cause Number ACT/015/025 in the appeal of the Division determination of Co-op Mining Company Tank Seam. I believe when we recessed, Mr. Hansen, you were in the process of calling your next witness.

MR. ADKINS: We are. I did omit one procedural matter last time, and I apologize. We have had considerable discussion about Co-op's Exhibits C and D. I'd like to offer those into evidence.

MR. LAURISKI: You might want to refresh us a little bit, so we can get back up to speed.

MR. ADKINS: Exhibit C and Exhibit D are appendices to Co-op Mine's permit application. They are reports prepared by Earth Fax Engineers, Co-op's experts.

MR. LAURISKI: Mr. Appel, Mr. Smith, are you up with us?

MR. APPEL: We would have an objection to Exhibit C. What is D?

MR. LAURISKI: It's entitled Appendix 7-N Revised Hydrologic Evaluation of Birch Creek Mine Permit and Proposed Expansion Areas.

MR. APPEL: I'm fine with that.

MR. SMITH: I'm fine with that.

MR. LAURISKI: It will be admitted.

MR. HANSEN: I'd like to call Charles Reynolds to go over some events and information that developed since the last hearing.

MR. LAURISKI: Mr. Mitchell, did you have any objection?

MR. MITCHELL: No.

MR. LAURISKI: You were hidden from my view.

You may proceed. Remind all of you, you have been sworn and you are still under oath.

BY MR. HANSEN:

Q. As you remember, Mr. Reynolds, last time we met you gave some testimony about the proposed bore hole between the Tank Seam elevation and the Blind Canyon Seam.

Can you tell us what has happened with that bore hole in the last month?

A. That bore hole has been completed, construction of the bore hole is complete.

Q. Can you describe the bore hole as it exists?

A. Currently it's an eight foot bore hole that goes from the Blind Canyon Mine up to the surface, adjacent to the Tank Seam outcrop. The -- with the hole completed, we've encountered no water seepage anywhere in the hole in between the two elevations.

At one point the hole did encounter a fault that partially intruded in to the hole and at that location there was also no sign of any water. The fault was just a minor fault with very minimal displacement on it.

Q. We also had some discussion last time about the various water tables underlying the permit area. Have you had an opportunity recently to examine the cliff faces in those areas?

A. Yes, I have.

Q. And what do your recent observations tell us?

A. Not just in the area of the springs, but throughout the canyon there are noticeable areas on all of those, the cliff faces, of these outcrops where there is evidence of water seeping from these formations, or evidence of water that is evaporated from cliff surfaces, indicating the presence of water in all three sandstone members of the Star Point that seeps to the surface.

Q. I have nothing further for Mr. Reynolds.

MR. LAURISKI: Mr. Smith? Mr. Appel?

BY MR. APPEL:

Q. Could you be a bit more specific Mr. Reynolds, on which cliff faces you've examined?

A. They're the outcrops of the Spring Canyon Tongue, the Storrs Tongue and the Panther Tongue that

exist within Bear Canyon, both on the east and west sides of the canyon. There's evidence in quite a few places. I've observed at least four or five places on the west side, and at least two places on the east side that indicate seepage from all three members. Seepage coming out of the Spring Canyon Tongue, out of the Storrs and out of the Panther sandstone.

Q. Are there fractures and joints that bisect those particular members?

A. Yes, there are.

Q. Did you see evidence of fractures adjoining on the surface that you examined?

A. There's no major -- there were no major faults or fractures next to the surface. There's also some minor fractures right near the surface. There were faces that -- there are no major fractures or faults that there was water seeping from.

Q. How do you define major in your terminology?

A. To me a major fracture is a fault with some displacement or a fracture that is visibly opened up, that you can see. In other words, you may have areas on a cliff face where there has been rock that has fallen from the face, and you don't always have a perfect face along the cliff. But there's no fractures that perpetrate through the entire formation.

Q. Well, you wouldn't really know that unless you drilled, would you, whether it permeates the entire formation?

A. That's correct.

Q. But you did observe cracks, something less than a vertical displacement that would be associated with a fault, or a significant fracture area?

A. I observed areas that would be less where they are fractured less than that, yes.

Q. That's fairly normal for this entire set of stratigraphy from the top of the mountain down, isn't it, those sorts of cracks?

A. Yes, you do have minor cracks throughout the entire -- all the formations.

Q. Did you take any measurements that would indicate how much water is moving through these particular formations?

A. Like I mentioned, most of it is just evidence of wet ground, of seepage, or of precipitous that's left on the surface from water evaporating, so there is no measurable flows in a lot of the areas, just evidence of seepage from the formations.

Q. When did you do this?

A. I looked at the faces of the ledges. It was Monday I went over, of this week.

Q. When had the last precipitation occurred in that area?

A. Couldn't be sure, exact. I know there was some minor snow that we had the previous week. If I remember right it was Friday, but I couldn't be sure.

Q. Had it been sunny over the weekend?

A. Yes, it was partially sunny, it was also sunny on Monday, when I was looking at it.

Q. Did you notice any eyes or snow left on the cliff face?

A. On the east side of the canyon there was some snow; on the west side of the canyon I don't remember any evidence. Usually when you get the sun on the west side the snow disappears quite rapidly.

Q. No further questions.

MR. LAURISKI: Okay.

MR. SMITH: Just a couple questions.

Q. Did you, Mr. Reynolds, have a chance to take any more measurements of the water that's being discharged out of the Bear Canyon mine?

A. Yes, we do monitor that monthly so we have since taken other measurements.

Q. Is the water still being discharged from the mine?

A. Yes.

Q. Do you recall how much?

A. It was for the month of October, the total discharge was, if I recall, it was around 140 gallons a minute that was discharged into Bear Creek.

Q. And is water still being used inside the mine for mining purposes?

A. Yes, it is.

Q. And do you know how much say, during the month of October, so we would be up to date, how much water is being used inside the mine?

A. I don't have any figures readily available on the monthly usage.

Q. Any water being impounded or stored within the mine?

A. Yes, there is.

Q. And how much water is that?

A. I wouldn't -- it would be too large to quantify, I'm not sure how much. On the usage, I do know that the average usage in mines runs between 10 to 20 gallons a minute.

Q. Okay. Nothing further.

MR. LAURISKI: Thank you. Mr. Mitchell?

MR. MITCHELL: Nothing.

MR. LAURISKI: Anything further?

MR. HANSEN: No, nothing further.

MR. LAURISKI: Thank you. Thank you, Mr. Reynolds.

MR. HANSEN: Co-op calls Richard White.

MR. LAURISKI: Does the Board have any questions of Mr. Reynolds? Thank you.

MR. FADDIES: I have one. The bore hole you mentioned, is it lined?

A. We're currently in the process of lining it.

Q. With what type of liner?

A. We're using corrugated metal pipe to line it.

MR. FADDIES: Thank you. That's all I have.

MR. LAURISKI: Any other questions? Thank you Mr. Reynolds.

RICHARD WHITE

was duly sworn, was examined and testified as follows:

BY MR. HANSEN:

Q. Would you please state your full name for the record?

A. Richard Bruce White.

Q. And tell us how you are employed, please?

A. I'm the president of Earth Fax Engineering.

Q. And are you a licensed engineer?

A. I am.

Q. Can you tell us a little bit about your

educational background?

A. Sure. I received a bachelor's degree from Utah State University in 1976 in Water Shed Science, and then received a masters degree in civil and environmental engineering from Utah State University in 1977. Since that time I have been a consulting hydrologist beginning with the firm of Vaughn, Hanson Associates and then with Ford, Bacon and Davis, and for the past 12 years have been with Earth Fax Engineering.

My practice has been predominately associated with the characterization of hydrologic regimes. Much of my work is focused on performance of hydrologic investigations with coal mining operations in the Carbon and Emery County areas.

Q. I'm showing you our Co-op Mine's Exhibits C and D. Can you tell us what involvement you had, if any, in the preparation of those exhibits?

A. I was involved in the review of these documents. As a principal at Earth Fax, one of my -- one of the projects that I had overall responsibility for was the Co-op Mining Company project. So I was involved in technical assistance since the work was being performed to prepare these reports, and then was involved in the review of the reports and inhouse discussions as the reports were being reviewed.

Q. Are you familiar with the information contained in those reports?

A. Yes, I am.

Q. Last time we heard Mr. Garr state that there was one inaccuracy that as the reports were originally prepared, there was information indicating production of 500 gallons per minute of water in the mine, and that had not been updated. With that exception, are you aware of any inaccuracies in the past contained in those two exhibits?

A. To the best of my knowledge they are, with that exception, they are correct.

Q. Have you been involved in the permit application for Co-op mine to have a significant revision to mining in the Tank Seam?

A. Yes. To the same extent as I was involved in the preparation of these reports. As I indicated, one of my responsibilities has been to provide general oversight to this project, and in that capacity I also assisted in the -- in the review, and in the discussions related to the revision for the Tank Seam mining.

Q. And what impact will mining the Tank Seam have on Birch Spring and Big Bear Spring?

A. It's my opinion that mining in this Tank Seam will have no significant impact on the, either the

quality or quantity of water in Birch Spring or Big Bear Spring.

Q. And why is that?

A. I base that opinion on the data that had been presented. The drill holes that were installed from the Blind Canyon Seam up into the Tank Seam, indicated that the zone between the Blind Canyon Seam up through and including the top of the Tank Seam were essentially dry.

Of the holes that were drilled, most of the holes yielded only a 10th of a gallon a minute water or less. One of the holes yielded half gallon a minute of water. Supporting that is also the results of the recent drilling of the shaft between the two levels, that Charles just spoke about. And the fact that also in that eight foot diameter bore hole, that intervening zone was also dry.

So the data indicates to me that the Tank Seam is basically dry, and as a result there will be no appreciable water encountered in the Tank Seam. Therefore, it's my opinion that there will not be any appreciable effect of mining in the Tank Seam on the quantity or quality of water in the Big Bear Spring or Birch Spring.

Q. What do you know about the relationship between

the location of the Tank Seam and the location of the regional aquifer or water tables in the permit area?

A. The Tank Seam exists at an elevation about 200 to 250 feet higher than the Blind Canyon Seam. The drill holes that have been installed from the Blind Canyon Seam downward into the aquifer systems below, have indicated that throughout most of the area that has already been mined, the water table is below the base of the Blind Canyon Seam through the northern portion of that area that has been mined. There is a pressure surface in one of those members that comes up above into the Blind Canyon Seam at the northern most extent of the current mining. That's a pressure service and not a water table. So the only way the water could actually get there is if that confining layer that was holding that water under pressure was to be -- was to be encountered. But as a minimum, that puts the water level in the aquifer systems in the area, at least a couple of hundred feet below the Tank Seam.

Q. What about the water that Co-op mining encountered as we're mining the Blind Canyon Seam, in particular the water that has already been testified came out from the roof?

A. It's my opinion that that water is the result of encountering perched aquifers that are present within

the Black Hawk Formation. It's not uncommon in the Carbon and Emery county areas in the mining operations for perched aquifer systems to be encountered. Generally the inflow to the mine that's been encountered at the Bear Canyon mine is inconsistent with the perched water systems where the water is coming in through the roof, and where that water -- the rate of inflow tends to slow down as the mining progresses. As you advance in the number of cross cuts, you tend to encounter water near the face of the active mining operation, and inflows behind you tend to decrease. And that's fairly consistent with what you would encounter in a perched aquifer system.

So it's my opinion that those are perched and are not part of that same system that is contributing water to the Big Bear Spring and to Birch Spring.

Q. Do you have any opinion as to the likelihood of contaminants being introduced in to the aquifer?

A. Yes, I do.

Q. What would that be?

A. It's my opinion that mining in the Tank Seam would not be introducing any significant quantities of contamination into the hydrologic system. The mining operations that have been conducted, I feel from my review, have been conducted in a manner that has

minimized the potential for impact to the local ground water system. And it's my understanding that the same mining operations would be utilized in the Tank Seam, and so I have not seen anything that would indicate to me that there's any measurable potential for an impact to water quality occurring from the mining operations in the Tank Seam.

Q. Mr. Montgomery spoke of the possibility of contaminants being released, but he didn't say or identify what kind of contaminants might be released. Do you have any opinion as to what kind of contaminants Mr. Montgomery would have had in mind, or what kind of contaminants might possibly be released in to the water through the mining activity?

A. There are -- you have a potential for the introduction of oil and grease that may result from spillage, if you were to have some kind of a spillage in the mining operation. The rock dust that's utilized to control the explosive atmosphere in the mine can dissolve and add additional salts to the water. The primary factor that I think eliminates the potential for mining in the Tank Seam to impact the quality of water from Big Bear Spring and from Birch Spring, is the fact that there is no appreciable water that exists between the Tank Seam, no appreciable groundwater between the

Tank Seam and the Blind Canyon Seam. So there's no driving force there. Even if there was some sort of an event that would otherwise cause contamination to occur, there's no water there to drive it down. And past mining operations have indicated that there's no significant impact to the water that's being discharged from the Blind Canyon Seam from the mining operations. And so I would, from that, conclude that there would also be no impact to water that -- as a result of mining in the Tank Seam.

Q. Aside from the fact that there is no water in the area of the Tank Seam for it to be affected, because if it is removed from the aquifer or available to contaminants, do we have any other information to indicate whether or not Big Bear Spring is hydrologically isolated from the aquifer?

A. Yes.

Q. Or from the permit area, execution me.

A. Yes. The Tritium data that were discussed earlier in the previous testimony, indicate that the age of water from Big Bear Spring is significantly younger than the age of the water encountered in the mining operations.

Q. Tell us about the Tritium dating, what it is and how it works?

A. Tritium is an isotope that -- an isotope of hydrogen that was increased in concentration in the atmosphere from the early 1950's until the early 1960's as a result of open air atomic bomb testing. Once that testing stopped, there was no more artificial introduction of Tritium into the environment. Any time that you run into concentrations of groundwater where Tritium concentrations are elevated, that's an indication that the water is of a relatively young age compared to waters that have a much lower Tritium concentration.

The water from Big Bear Spring, Tritium concentrations there are approximately 10 times greater than the Tritium concentrations in water that's encountered in the mining operation. And so that would indicate to me that the Big Bear Spring has a source that is different than the source of water for the mining operation, and that the two were not hydrologically connected.

Q. Is that conclusion also consistent with what we know of the presence of the Mancos Tongues and the water tables separating between the Mancos Tongues and underlying regional aquifer?

A. Yes. The water levels in the three separate tongues of the Star Point Sandstone which underlie the

Blind Canyon Seam, the aquifers that were encountered during the drilling of the holes from the Blind Canyon Seam downward, as I indicated earlier, that water, as you go to the north, that water is under pressure, and rises above the confining layers.

The tongues of the Mancos Shale which interfinger with the Star Point Sandstone in that area, serve as confining layers, and so that water, as you go north ward, is under confined conditions, rises in a well above the top of that Sandstone Tongue.

And any time that you have water that's under pressure such as that, that's normally an indication that the source of recharge is not immediately at that point, but the primary source of recharge is somewhere up gradient to that point where the water can get into, into that unit. And then as it flows down gradient, and gets into an area that's -- where that confining layer is over lying it, it's at that point that it becomes confined. And so that would be at some point up gradient or north in this case, would be the primary area of recharge for Big Bear Spring, and Birch Spring and the other springs around there that are receiving their water out of these tongues of the Star Point Sandstone, rather than that recharge coming from the immediate area of the mine.

Q. Do we have any other information to show whether or not Birch Spring is hydrologically isolated from the permit area?

A. Yes. In water quality samples that were collected from Birch Spring, the Tritium data indicated Birch Spring was also relatively old water. But the chemical data obtained from Birch Spring compared with the water from the mining operation, indicated that there was a significantly higher concentration of sulfate from Birch Spring, and that the waters that were discharging from Birch Spring were chemically dissimilar to the water that was contained in the mine.

If the mine was to be up gradient from Birch Spring, and if the water flowing through the mine was to eventually find its way to Birch Spring, you would expect that the chemical signature of those waters would be fairly similar. And yet, the elevated concentration of sulfate in Birch Spring indicates that those waters are not chemically similar. And that they therefore have different sources.

Q. Are there any other elements of the chemical analysis that would further support that conclusion?

A. Those are what come to my mind immediately.

Q. If we could take a minute. I'd like to briefly refer everyone to Exhibit D.

MR. CHRISTENSEN: Which Exhibit?

MR. HANSEN: D. Maybe I just need clarification on this point. Turn first to page 2-39.

Q. Can you tell us what that page describes?

A. Yes. Those are a summary of results of analytical data from samples collected from Birch Spring, it appears, in 1987, 1989, and 1991.

Q. And then if you could tell us what we see on pages 2-31 and 2-32.

A. 2-31 and 32 is a summary of data obtained from the inmine monitoring wells, chemical data.

Q. And are there also, in addition to the sulfates, do these three tables show other chemical differences between the water in Birch Spring and the water that's encountered in the mine?

MR. SMITH: I object. I'm unclear on what we're doing. We're looking quickly at tables, and then -- I'm confused. I guess my objection is I don't know what they're doing, so I can't even make a sensible objection, because he's calling for conclusions after we look at a table for five seconds.

MR. APPEL: I'll object and join in that on lack of foundation. We don't know where these inmine samples were taken, we don't know what lab did it, we don't know anything about chain of custody for these samples. And

on that basis to draw a conclusion would be very unfair to us.

MR. HANSEN: Well, Mr. White already testified without objection that the information contained in here in this exhibit is accurate. If on cross-examination they would like to question the accuracy, that's fine.

MR. LAURISKI: Yes, and also note that both of you agreed to allow these exhibits, this exhibit to come in without objection. So, I think to provide an opportunity to cross examine Mr. White on those tables would be more appropriate and I'll overrule the objections.

BY MR. HANSEN:

Q. For example, I'd like to call your attention to a couple of entries. On page 2-32, there's an entry on the inmine water referring to TDS, that is total dissolved solids?

A. Yes.

Q. And 2-39 there's a similar entry for TDS for the Birch Spring?

A. Yes.

Q. And it would appear that the water from Birch Spring is significantly more salient than the water encountered in the inmine monitoring wells.

MR. CHRISTENSEN: What are we looking at,

bicarbonate or --

THE WITNESS: What he's referring to on page 2-32, the top line, top analyte there is listed as TDS, and comparing that over on page 2-39 with the third line down, that says TDS.

MR. CHRISTENSEN: Okay.

THE WITNESS: And comparing those two sets. Total dissolved solids, measuring the general salt content of the water.

MR. CHRISTENSEN: Thank you.

BY MR. HANSEN:

Q. And would we be able to make similar comparisons of other elements from the two sources?

A. Yes. We may be able to, but I would need to sit down and take some time with the tables to make some comparisons, but that may well be possible.

Q. I don't want to take up everyone's time with performing that kind of analysis. The information exists as it is in the tables.

Mr. Garr, and I believe Mr. Reynolds, mentioned the existence of a fault on the west side of the permit area east of Blind Canyon. Can we draw any conclusions from the existence of that fault?

A. Are you referring to the Blind Canyon fault?

Q. Yes.

A. Yes. That's a fault that exists basically along the -- as I recall, on the western, just west of the permit area, but east of Birch Spring. So the fault runs between the mining operation and Birch Spring.

Q. How far away is the fault from Birch Spring?

A. As I recall, off the top of my head, it's about 800 feet from Birch Spring to the fault.

Q. Now, if that fault was open and allowed water to flow through, would the water entering that fault flow into Birch Spring?

A. No. In either case, whether the fault is serving as a conduit is open and is a pipeline basically for water, or if the fault is serving as a barrier to the flow of water, in either case, that fault would serve as a barrier for the flow of water from the mining operations over toward Birch Spring. If it was serving as a conduit, then any water that was flowing to Birch Spring from the mining operation would be encountered by the fault and would be conveyed along the fault. If it was serving as a barrier, then water flowing towards that fault would hit that barrier and would not be able to flow through, and it would be turned and flow again down to the south along that fault.

Q. Mr. Montgomery relied considerably on information in some U.S. Geologic survey reports. I

note that Exhibit C and D contain a considerable amount of cited information. Why didn't your Earth Fax rely on those same reports?

MR. SMITH: I object, we're having comments about the evidence by counsel, and I object to that. He can ask questions, but shouldn't comment about what evidence is contained in these various reports. So I object to the form of the question.

MR. HANSEN: I did not comment on the evidence, I just recalled a fact.

MR. LAURISKI: Just rephrase the question, Mr. Hansen.

BY MR. HANSEN:

Q. Why did Earth Fax rely so heavily on site specific information and to a lesser extent on the U.S. Geologic survey reports?

A. We felt that the U.S. Geological survey reports were a good indicator of general conditions in the area, but felt like it was of most value if we could obtain site specific data. Site specific data would be much more indicative of what would be happening at the Bear Canyon mining operations. Therefore, as we discussed the data we felt would be necessary in order to better characterize hydrologic conditions at the Bear Canyon mining operations, Co-op Mining Company agreed that it

would be valuable to collect the site specific data so we could know what was happening on-site as opposed to merely drawing our conclusions from the regional reports that had been prepared.

Q. Would mining the Tank Seam result in sealing off any faults and fractures in the existing area creating an impermeable barrier for any additional water flowing down?

A. I don't believe it would.

Q. Why not?

A. Any mining activity that occurs -- the only area where you've got any significant traffic occurring, is directly in the man ways. That mining operation is conducted on -- normally there's coal left on the floor. You have a much better floor to the mine if you have coal on the floor, so there's coal left there. That coal is generally somewhat friable, and mere driving of vehicles across that floor in my opinion does not create an impermeable barrier, vertical barrier at the floor.

Most of the area actually is left in pillars. Then in retreat mining those pillars are pulled, and there's essentially no traffic in the area where those pillars are. During the immediate time that the pillars are being pulled there's no repeated traffic over that area,

and so there's really no potential there during the pulling of those pillars for any compaction to occur. There's no, in the floor of the mine, there's no significant amount of clay that you would be compacting into a fractures that would create any impermeable barriers. So I don't believe mining in this Tank Seam would create any impermeable barriers to water.

MR. HANSEN: I believe I have no further questions at this time.

MR. LAURISKI: Quickly while we're on the subject, what is the floor lithology of the Tank Seam?

THE WITNESS: I would have to look through the drill logs to make sure, but as I recall, what's right below the Tank Seams are sandstone members of the Black Hawk Formation.

MR. LAURISKI: Thank you. Mr. Smith? Mr. Mitchell, you have anything?

MR. MITCHELL: Nothing.

BY MR. SMITH:

Q. Yes. I have a couple questions about -- I'd like to refer your attention, Mr. White, back to Exhibit D and to page 2-39. That's, I guess, some analytical testing of the Birch Spring, and you testified about the total dissolved solids and I think you compared, if I recall, Birch Spring total dissolved solids to some

wells or water that was taken from the mine; is that correct?

A. Yes, that's what we're doing.

Q. It seems to me that the water quality, according to your tests, has changed quite a bit in Birch Spring over the three tests that were done there going from 400 to 800 and back to 400; is that correct?

A. Other than the fact these are not our tests; these are data that were provided to us, as I recall, from the water companies. But yes, the data do indicate there has been a fairly -- there has been a change in the quality of that water on those three events.

Q. I would assume water quality to change, mountain mine water as well at different times could be different water quality?

A. There are always naturally occurring changes in the quality of the water, yes.

Q. You have no reason to believe this data is incorrect; you include it in your report, right?

A. That's correct.

Q. Going to page 2-32 which is the chart on the mine quality water, do you know when those tests were taken, on what date? Compare apples to apples here, if you can compare dates.

A. These wells were sampled in May of 1992.

Q. So that's at least a year different from any of the dates of the Birch Spring tests?

A. That's correct.

Q. Do you think that's a fair comparison?

A. Sure.

Q. Even though it could double or half or whatever, as it did in Birch Spring?

A. I think any time the more data you have the better, but I think this is a reasonable comparison for the general conditions that you would expect to encounter in Birch Spring versus the water encountered in the sandstone members that underlie the Blind Canyon Seam.

Q. And because -- as I recall, wasn't the Tritium testing that you used to differentiate Birch Spring from the mine water, it was a chemical analysis, isn't that correct, the Piper and Stiff?

A. Yes, that's correct.

Q. You couldn't differentiate those, correct?

A. That's right, but the Tritium data indicated in both cases that the water encountered in the mine and the water encountered in the Birch Spring were relatively old.

Q. But seems like the chemical composition can change quite dramatically, I would say a double change,

and then doubling from 412 to 810. That's a very dramatic change in chemical composition in Birch Spring, yes or no?

A. Yes, that's correct.

Q. Okay. That doesn't call any questions into your mind about whether you're differentiating the water on a chemical basis is valid or not?

A. As I recall, I'll have to look back through to verify, but as I recall, we -- in fact, if you want to give me a minute, let me look through and see what we used in that chemical comparison.

These were average analytical data that we used in the preparation of the Piper diagrams and Stiff diagrams.

Q. Average of what?

A. In the case of Birch Spring, we used data from eight samples, averaged the data together in order to get the points.

Q. What were the dates of the eight samples?

A. I'll have to look back through the original data.

Q. So you don't know?

A. Not sitting here, no, I do not.

Q. We're here today having the hearing and we have to know what you know today, not what you may have known

or would know at some other time. So you don't know what the dates of the Birch Spring samples were that were used to differentiate the Birch Spring water from the --

A. It would appear here, it says results of the sampling in 1991. So these were data obtained in 1991, and eight samples from Birch Springs that we used in the preparation of that Piper diagram.

Q. When was the mine water sample, same time?

A. I believe I just indicated it was May of 1992. Oh, wait. You're talking about the mine water that -- which mine water?

Q. The mine water that was used for, you know, for your chemical, Piper and Stiff diagrams you have used as a basis to say these are different waters.

A. Those were also collected in 1991, for the generation of the Piper diagram and Stiff diagrams. We used data from the same time frame.

MR. LAURISKI: This was for the purpose of the Tritium levels?

THE WITNESS: No. Excuse the confusion here. What we're comparing now are the Piper diagrams and Stiff diagrams that appear on page 2-27 through 2-29 of Exhibit D. They're a representation of chemical data, and I was being questioned as to whether or not we're

looking at similar time frames for the chemical data that went into those figures. And yes, they were, they were all data collected in 1991. That again is separate from the Tritium data.

This is just looking at chemical data, all collected within the same, within the same year. And we utilized the available data base for each of those points collected during that year, so we're trying to compare as closely as possible, data from the same time frame. So in case there were oddities for whatever reason, due to this temporal variation, we would hopefully be able to remove those oddities by looking at data from the same time frame.

BY MR. SMITH:

Q. Was there any attempt to -- let me ask this. Water moves very slowly through rocks; is that correct?

A. In this area, yes. The flow of groundwater is relatively slow.

Q. And so, since the mine and Bear Spring are at least a little bit separated apart, did you do anything to try to get the water, same age water?

A. I really can't, within the time frame that we have. As I recall, from the hydrologic tests that were conducted in the inmine monitoring wells, the travel time from the mine to the Birch Spring area was on the

order of one or 200 years. And so, to try to say that this is water that would have gone underneath the mine at the same time, we would have to wait for that time frame. So all we could really do in that case was say that these waters that we're encountering now, are a function of whatever history they have been through. And in trying to compare, in this case, we're trying to see if there was anything that indicated that waters may be of a similar source or a different source.

Q. What was the chemical difference between the Birch Spring water and the mine water?

A. As I recall, the primary difference was that the Birch Spring water contained significantly higher sulfate concentrations than the mine water.

Q. But directing your attention to 2-39, in just your time frame, the sulfates had a three time or went from 100 to 298 back to 120, in the three tests?

A. At Birch Spring?

Q. Yes.

A. Right.

Q. So, just because you took some tests in '91 of Birch Spring water, it's very difficult to say that's the way -- the water certainly isn't that way all the time?

A. It is interesting that the time frame we

utilized was in the low end of that range when sulfate concentrations were lower, and those sulfate concentrations there at Birch Spring were still higher than elsewhere.

Q. But they were not, they were quite a bit higher than they were in 1987. When you say the low end, you're -- it would be 129 milligrams per liter, where a few years earlier it was only 102?

A. Again, we had to use data from an overlapping time frame so we -- so we could minimize to the extent possible any temporal effects. And data we had were from 1991, and the -- at least the sulfate data from the one sample that's presented here, is indicative of the lower end of that range as opposed to the higher end. And again, sulfate concentrations were the things that were the highest in the Birch Spring water as opposed to being something that was significantly lower.

Q. Now, since that was the difference, it seems like at least one of the samples, and I direct your attention to 2-32 of the sulfates in the mine water, was identical to the Birch Spring water, 128 as compared to 129?

A. The one thing you need to remember, is that the data on in table 2-6, which is on pages 2-31 and 2-32, those are samples that were collected from the inmine

monitoring wells which are monitoring the Star Point sandstone below the mine. Those are the things that feed into the -- where water from those tongues of the Star Point sandstone feed into Big Bear Spring and feed into Birch Spring.

The mine water that we're comparing in the Stiff diagram is the water that actually is encountered in the mine. The data from table 2-6, those -- that water is not encountered in the mine, it's merely monitored by wells drilled within the mine, but water below the mine. And the water that is compared in the Stiff diagram is water that has actually flowed into the mine and has been sampled.

Q. And do we have the results of those chemical tests in any of the exhibits that we have here today?

A. I'd be glad to look through here and let you know.

There's at least some data presented in table 2-5, which is on page 220 of Exhibit D. Let me look on the other exhibit. I believe in Exhibit C there are some analytical results that are presented on page 2-16, 2-17, 2-18. It appears out of these two exhibits, that's primarily what we have for the water quality on the water flowing in to the mine.

Q. Does that have the sulfates in it?

A. Yes, there are sulfate data there.

Q. For those of us not as good on the atomic --

A. Go across the top.

Q. On the chart, the --

A. The 4th column from the right, it says SO4. That's the sulfate. And if you'll look down on page 2-16, look down the last three rows, roof drips, above Su 1, above Su 3 and SBC-1, you can see sulfate data there. Similar on the next page, next couple of pages have similar sulfate data reported.

Q. Now, I have a question about these inmine monitoring wells. What water do they -- this is back on 12-32, what aquifer did those wells go into?

A. Each of those wells is completed in a -- there are multiple completions. Each of those -- no, each of those monitoring wells is completed in a different member of the Star Point Sandstone.

Q. I see.

A. There are three different members of the Star Point Sandstone beneath the mine workings. And again, for reference, all of this discussion is below the Blind Canyon Seam that we're talking about now. The Star Point sandstone has three different sandstone units in it that are separated by shaley tongues of the Mancos formation, and so those monitoring wells were completed

in one -- each in those three different tongues.

Q. And help me if you can on this, where is the area of recharge for the Star Point Sandstone aquifer?

A. It would appear to be north of the -- primarily north of the mining operations, north of the permit area.

Q. Is that the same location as the recharge area for the Black Hawk water that's found in the Black Hawk Formation?

A. Yes, there's going to be some. Yes. I would assume the Black Hawk is also recharged up in that area.

Q. And so the water that goes into the Star Point formation at some point has to go through the Black Hawk Formation?

A. In general terms, yes, because the Black Hawk overlies the Star Point.

Q. And if -- okay.

A. The difficulty in understanding that, is that there is -- there's a zone. At a minimum there's at least one zone up north of the permit area that was referred to in previous testimony as the shattered zone where there is a significant amount of fracturing that has occurred. And so as water up on that plateau melts, as the snow melts and you get water that percolates down

through the subsurface, until it comes down and encounters something that's going to serve as an aquifer in an area that's highly fractured, the resident time for that water may be fairly short. So it's not like it has to make its way down through a significant amount of number of sandstone lenses and shale lenses within the Black Hawk Formation before it reaches the Star Point Sandstone.

Otherwise you wouldn't be getting the apparent younger aged water from the Big Bear Spring, as compared to water that you encounter higher in the -- stratigraphically higher in the mining operations. So, it's likely that a fair amount of recharge occurs back in that shatter zone, that again being a few miles north of the permit area, and that that water percolates down and probably gets into the Star Point Sandstone back up in that area.

Q. Okay. I'd like you to look at page 2-6 of Exhibit C which is the Probable Hydrologic Consequences. I'd like to ask you some questions about some different points from these exhibits so I understand.

I'll read from the very bottom of that page. It says, "Star Point Sandstone together with the lower Black Hawk Formation, the Black Hawk/Star Point aquifer

is considered by Lines to be a regional aquifer."

That's from one of the USGS studies, isn't that correct?

A. Yes, that's correct.

Q. Mr. Lines grouped the Black Hawk which is next to the Star Point together with those two aquifers and considered it to be a single aquifer?

A. That's correct.

Q. And I'd like you to look at page 2-9, and it says, middle of the first paragraph on that page, "There's no springs in the permit area," that's correct, right?

A. Yes. I was trying to find out where you were reading.

Q. And from there, going down four lines. "The two largest springs in the area are the Big Bear Spring and Birch Spring, are associated with faults and joints and issue from the Panther Tongue of the Star Point Sandstone."

A. Yes.

Q. That's correct?

A. Yes.

Q. As I understand it, both of those springs are there because there's a joint or a fault?

A. That's correct.

Q. In that location.

A. That's correct.

Q. Have you done any investigation to see where that fault goes or how big the fault is for those two springs?

A. Personally, I have not. I'm not a geologist, I'm a hydrologist, and I have not personally followed the joints there. Generally I can tell you that joint systems individually tend not to be highly laterally continuous. You have a joint system, you have a general trend of joints, but you cannot typically trace a joint like you can trace a fault where you may be able to trace the fault for several miles. With a joint, joints tend to be much shorter and are associated with multiple other joints so to be able to track one joint back tends to be rather difficult.

But I'm assuming that the joint system is going to be, and as typically occurs, the joint system is coincident with the geological conditions, and so those are generally going to run north and south just like the fault systems run.

Q. Do you know how much vertical, how high vertically the joints may extend for those two springs?

A. No, I don't.

Q. So you don't know if they would go up into

other -- they would go above the Panther Tongue, or whether they would just be combined with the Panther Tongue?

A. I don't know. I can tell you generally in the area, joint systems do not extend through the shaley layers of the Mancos. The Mancos tend to be fairly plastic, and so the tectonic events that would have created the joint systems, unless it was sufficient to create a significant offset, typically those joint systems do not go up through the Mancos tongues because it is plastic enough that during that tectonic events it would have molded as opposed to cracking and allowing the joint to extend on up through it.

Q. But at some point, something has to have gotten through the Mancos tongues. If it didn't, there would be no water here to feed these springs.

MR. HANSEN: Objection, counsel is trying to testify here himself.

BY MR. SMITH:

Q. Do you agree or disagree?

A. You're making the general assumption the Mancos tongues are laterally continuous, which they're not. Typically the tongues of the Mancos that are encountered out in that general region, tend to be rather limited in their aerial extent. So what you're assuming is that

those tongues extend back up in to that area where the recharge is occurring to the Star Point Sandstone, and I don't think that that's a safe assumption to make.

Q. And I don't want to make a wrong assumption. Do you know where those tongues end?

A. I don't. I have no data to indicate where they go, however, you're correct in your statement that there has to be a source, there has to be a place where that water can get into the system.

Q. It's coming down from above?

A. Yes, that's correct. And so that tells me that at some point up gradient, those tongues are nonexistent, so that you've got a condition that would allow the water to percolate down through that overlying rock and get into the Star Point Sandstone. And it is typical that tongues elsewhere around that general area, that tongues that occur are relatively aerially nonextensive which you don't find over multiple miles with a tongue.

So, again, I would conclude that that shatter zone is a probable area of recharge, and that it's very likely that those tongues don't exist back up in there, and that's allowing fairly easy access for the water to percolate down into that sandstone. Even if the tongues did exist, that shatter zone has been tectonically

altered enough that the fact that the water is under pressure tells me that the water is able to get in at that higher elevation. And that if those tongues do exist back there, that tectonic activity would have been sufficient to cause fracturing to go through the tongues.

However, for what it's worth, I really don't think that tongues go back up there, because again, the Mancos tends to be benetic (sic) and whatever fracturing occurs, it tends to seal itself off. So that would preclude water from getting in to the Star Point.

Q. And the tongues, there were three test wells drilled and that's how they were discovered?

A. Yes.

Q. Any other tests to determine the extent of those tongues or where they are other than those three?

A. We've looked at, of course, surface outcrops. But going back into the mountain, those are the only data that we have at this time.

Q. Okay. I'd like to direct your attention to page 2-10 of the hydrologic consequences. Do you know why initial spring and flow rates weren't listed here for Big Bear Spring and Birch Spring? It has NM, not measured. Do you know why that doesn't appear?

A. I don't know. I can read through and see if

there's any indication here. I would assume, again, these were data that were -- I believe what this table was doing was presenting the initial data, the earliest data that were available. And since these data were provided by others, by the water companies, I would only assume that they had some indication of activity at those springs, but did not have a flow rate.

Q. You say initial, is that baseline data?

A. Yes.

Q. That we're talking about?

A. This would be the first set data that were collected at each of these particular points. A true baseline would include some more data, but this would be the first bunch of information that would have been collected there.

Q. Okay. I'd like to direct your attention to 2-13 of the PHC.

MR. LAURISKI: Are we still on Exhibit C?

MR. SMITH: I'll try to do it in order. We'll do C and a little bit on D.

THE WITNESS: Which page?

Q. 2-13, the bottom paragraph. I think we've talked a fair amount about this with the previous witness. I don't know if we have to spend much time. That talks about a dramatic increase in flow that

happened into the mine. Do you know how much water is currently inflowing into the mine at this time?

A. Just generally. The general indications back in October, when the corrections were made to these documents, were that there was about 100 or 210 gallons a minute that was --

Q. That's what's being discharged?

A. That was what was flowing in to the mine in October, of which 180 gallons a minute, approximately, was being discharged from the mine. And approximately 30 gallons a minute was being used underground.

Q. Any measurement of these? Do we have any meters or flumes or anything to measure these?

A. It's my understanding, at least on the discharge, yes, there are measurement methods. Underground, that's difficult to measure because it's used in a variety of sources, so it can only generally be estimated based on the consumption of each piece of equipment.

Q. We heard testimony earlier today about there's a storage area of water in the mine. Are you familiar with that?

A. Yes.

Q. Do you know how much water is being put into storage?

A. I do not.

Q. So you don't know how much water is being put into storage. So, how do we come up with how much water? Why don't you tell us again, so I understand. I'd like you to talk about each -- I understand there's three things you are using water or in the mine, some is being put in storage, some is being used for mine uses, and some is being discharged.

A. That's correct.

Q. Do we know what those three are?

A. Generally the -- at this time the storage, the amount of additional water are going to storage and generally be assumed to be zero. The storage areas are generally full, and any additional water that is encountered, typically, merely routes through those storage areas. And so you basically have inflow equaling outflow.

During initial construction of a sump area underground, you're not going to have discharges from the mine at the time you are filling the storage areas. But those have been in use long enough now, that any inflow to the storage areas is basically coming out as outflow. So, I don't believe there's any significant amount of that that's being lost to storage.

So as I review the data, I would still indicate that

there's about 200 gallons a minute of water that's encountered, and about 20 or 30 gallons a minute of that is used underground, and the remainder is discharged. Charles indicated that there have been some additional decreases in that flow, and that the amount being discharged now is about 140, as opposed to 180 gallons a minute.

Q. Do you know how much water that is, 140 gallons a minute over a year, do you know how much water that is?

A. I can easily calculate it if you want me to.

Q. Maybe just give an estimate.

A. I'd have to.

Q. You'd have to times it by 60, and then times it by 24, and then times it by 365.

MR. HANSEN: I object, counsel can do the calculation. It's not really relevant in any case.

THE WITNESS: Do you want me to calculate it?

MR. SMITH: I don't think we need to do that.

THE WITNESS: Okay.

Q. Page 2-14, same exhibit. Birch Spring and the mine water, we have waters can be distinguished on Tritium analysis?

A. That's correct.

Q. At the bottom it says -- of 2-14, it says, "The

age of water from Big Bear Spring cannot be determined."

A. Yes, the --

Q. Can you explain that? I'm confused.

A. The Tritium that's indicating that, the data do not allow us to put an exact date on the age of the water. We can't give you a year that water hit the water table based on our existing data. We can tell you relatively that the water issuing from Big Bear Spring is significantly younger than the water that's encountered in the mine, but we can't put a date on either of those, just give you relative ages.

Q. Go to page 2-22. I'm sorry, 28. I'm sorry, I'm sorry, 2-22. 2-22. And that's the Piper diagram; is that correct?

A. That's correct.

Q. And based on the Piper diagram you can't distinguish between the water that's in Big Bear Spring and the mine water?

A. That's correct, based only on the Piper diagram.

Q. Now, go to page 2-28, first paragraph. In the second sentence, water from DH, drill hole #2, has calcium; is that drill hole #2?

A. Yes.

Q. Has a calcium, magnesium, sodium potassium-sulfate pattern. This pattern is distinctly different from the groundwater that has been sampled in the permit and adjacent areas, and is presumed to be due to the dissolution of locally occurring sulfate salts.

Is that correct?

A. Yes.

Q. So chemical components of water can be affected by something that's right there in a local area.

A. Yes, that's correct.

Q. And so, for example, Birch Spring could be affected by locally occurring sulfate salts near where it issues from the rock?

A. That's a possibility, although you would expect to have seen some other effect on other constituents as well as just the sulfate, if that was the case. One of the things that needs to be remembered in evaluating the data, and that are discussed here on page 2-28, is that each of those wells, again, is completed in a different sandstone unit. And while those sandstone units are hydraulically or probably hydrologically connected somewhere back up near the recharge zone, they are currently distinct and are not hydrologically connected to one another.

So what's local to DH2, the term "local" here is

relative and I would not want that to be interpreted as saying something that's within a 50 foot radius or relatively small radius. This is a unit that, again, appears to be somewhat aerially extensive, at least beneath the mine workings. And so the mine workings that the water has had to flow through before it's gone to DH2, could have significantly changed what's happening. What you see at DH2 versus what you see in DH1, 2 and 3 because these are hydraulically separated.

Q. Did you do any further testing of the Birch Spring to try to determine whether there was any locally occurring sulfates in the area of Birch Spring?

A. You are wondering about sampling of the rock and that sort of thing?

Q. Yes.

A. No, we have not.

Q. I'd like to have you now, move to Exhibit D, and go to page 2-4 of Exhibit D. And on the second paragraph if you're there on that page, I didn't understand the paragraph, and I would like maybe to get that clarified. The Black Hawk, Star Point the Blind Canyon Seam is about 100 feet above the Black Hawk Star Point contact; is that --

A. That's correct.

Q. That's correct?

A. Yes, the Blind Canyon Seam, there is a coal seam that sits right on top of the Star Point, but that's not the Blind Canyon, that's the Hiawatha Seam.

Q. That's the Hiawatha?

A. Yes.

Q. That seam has not been mined in this area, I take it, or has it?

A. In the area, it has. Whether it's been mined right in the Bear Canyon area, in the past, I'm not sure.

Q. You don't know?

A. I'm not sure.

Q. Okay. I'd like to go to page 2-11.

MR. LAURISKI: Can you, Mr. Smith, tell us what 2-11 is? We seem to be missing that. Some of us, anyway.

MR. SMITH: I'll read it. It's just the current groundwater. Must not have been copied.

MR. HANSEN: Mr. Chairman, I had this document copied in your library and took it to Kinko's and found out afterwards a couple of pages may have been omitted from the copying, and it's possible those are the pages.

MR. SMITH: I'll read the last sentence out loud on that page.

MR. LAURISKI: I can share here.

MR. SMITH: It says on 2-11, the fact that the Star

Point aquifers are separate, hydrologically distinct, a single water table does not transect the stratigraphic units as proposed by Danielson et. Al., in 1981. Suggest the regional aquifer in the study area is actually located below the Star Point Mancos Shale contact."

Are we talking about below the Star Point aquifer?

A. I think the concern that we have, we had an inhouse -- had a rather lengthy discussion about the use of the word, or term regional aquifer out in this area. As you indicated, I think as we've discussed a little earlier, and as you read in a portion of this, Greg Lines in his USGS publication on work that he performed in the Trail Mountain area, which is south of here several miles, came to the conclusion that the Star Point and Black Hawk aquifer, Black Hawk formations can be viewed together as a single aquifer, the Black Hawk overlying the Star Point. And as you go deeper into the mountain, the water table tends to rise. And so both the Black Hawk and Star Point become saturated, and they're viewed in some areas down there as one system, and as typically referred to as the regional aquifer.

As we drilled the holes from the Blind Canyon Seam downward into the Star Point Sandstone to try to gather some local data, we found as it was indicated here, that

there are distinct aquifers, three separate saturated systems, each corresponding to a different tongue of the Star Point Sandstone. And that that typical regional aquifer that Lines was defining did not exist here. We did not have one saturated Star Point Sandstone unit with that water table rising up into the Black Hawk Formation, and in fact did not even have one distinct, just Star Point Sandstone aquifer.

And as we discussed inhouse, the appropriateness of the use of the word regional here, we felt like it was difficult to conclude that this was the same regional, if you will, aquifer, and that's why it's in quotes. That has been discussed by Lines and others in that area. And we felt that based on a review of geologic data in the area, and from our experience elsewhere, that there was no regional aquifer above that point.

And so if there was here, a regional aquifer in quotes, that that had to be below this. I think it's really just a point of semantics, I think, that if Star Point is generally considered to be eventually contributing to something that might be termed a regional aquifer, it's just that in this area, it cannot be defined as being the same thing that it's usually defined as elsewhere with the coal mining operations in the region.

So, we didn't feel that it was appropriate to use that term, and yet in conducting hydrologic characterizations of coal mining operations, the regulatory authorities are normally interested in seeing what the effect is going to be on a regional aquifer. We didn't feel there was one here, and so we were stating that if anything like that exists, we haven't encountered it.

Q. You don't think there is a regional aquifer in this area?

A. Well, again, it's -- it becomes, and this is why we had so many discussions inhouse, it really becomes a matter of semantics, of what is a regional aquifer. How aerially extensive is this thing supposed to be. What we've encountered was a condition that was atypical of what had been described elsewhere in the Carbon and Emery county area. And so, whether this contributes to something on a regional basis or not, I don't know. We don't -- we didn't feel that it was worth the time and effort to follow this off the permit area in order to answer that kind of a question. We knew what was happening beneath the permit area, and felt like we had a good enough handle on what potential impacts would be on mines in this permit area.

And so whether this contributes to something on a

regional basis, I don't know. It may well, it may not.

Q. So then do the -- does big bear and Birch Spring, do they issue from a regional aquifer?

A. They issue from the Panther Tongue of the Star Point Sandstone.

Q. So --

A. You know, whether that's part of a regional aquifer or not, I don't know. Again, it's just a matter of semantics.

Q. Just so I understand, when you are saying the regional aquifer may be below the Mancos Shale, that's a very thick, 600 foot thick of impervious rock. That's pervasive throughout that whole area?

A. That's correct.

Q. This underlies the valley of where the -- in Emery County and Carbon County, in other words that whole area?

A. That's correct. Although there are tongues in the Mancos Shale that are considered to be aquifers also, and so, again, we got into this discussion that became a semantics issue, and what is regional and what isn't. This was a condition that appeared in the area of the Bear Canyon mine permit area. We didn't want to infer from that that this was necessarily what was happening for several miles around the Bear Canyon

permit area. We wanted to make sure it was clear that we knew that this was what was happening locally.

Whether or not this was happening regionally, we didn't know and really didn't want to get in to that, and so we're just saying here that we don't know if this is part of it. And it largely becomes -- we felt like it was going to become academic to answer that question.

Q. Okay. Let me direct your attention to --

MR. LAURISKI: Mr. Smith, how much longer do you anticipate.

MR. SMITH: I'm almost done.

MR. LAURISKI: I think we probably need to take a little bit of a break. If you are going to be done in five minutes --

MR. SMITH: I will be.

MR. LAURISKI: Okay. Thank you.

BY MR. SMITH:

Q. Page 2-38. Your report reports an event of increased flow and decrease in water quality, in this paragraph, in 1989, both in Birch Spring and also within the mine itself. Do you have any explanation for that, those things happening at the same time in the mine and also in Birch Spring?

A. No. We indicated in there that there's -- we

could not come to a conclusion, that normally if we had said that those were synonymous, the results of the increased inflow into the mine was something that was associated with the increased inflow in water from Birch Spring, we would have expected the quality of the water in Birch Spring, the TDS to decrease rather than increase, because the mine inflow was a better quality water. And so, we would have expected that if it was the same event, that there would have been dilution.

And so as we evaluated the data we could not find a correlation between them.

Q. Doesn't it seem extremely coincidental that we would have increase in flow in the mine and Birch Spring if there wasn't some common course or interconnection between those two sources?

MR. HANSEN: Objection, argumentative.

MR. LAURISKI: I'll let him answer the question.

THE WITNESS: It definitely seems coincidental, but again, as we evaluate data, we could find no reason for the two to be associated with one another. And as we evaluated the data, we said if they were associated, different things should have happened, and we could not find that correlation, as I remember.

Q. I want to show you these exhibits. This is the 1980 to 1994. I think this is Exhibit 15 or 16.

MR. HANSEN: I'll make an advanced objection to any examination on these exhibits, both on the grounds of relevance and also as exceeding the scope of direct.

MR. LAURISKI: Mr. Smith, any response?

MR. SMITH: I don't think they exceed the scope of direct. There are similar charts in their D and C that they have here. I think they're relevant, because he's testified he doesn't think there has been any impact, or will be any impact on these springs by the mining activity. And all I want to ask, I've got one question for each, if he has any explanation.

MR. LAURISKI: Well, where does all this take us to the Tank Seam?

MR. SMITH: Well, I think it takes us to the Tank Seam because I think your -- well, and I've got this maybe from my closing and if you ant to hear my argument I'll give it now, but I think -- well, let me put it this way. When we were here before, I think we got -- I heard let's try limiting our scope to the Tank Seam. I don't think that's the purview of this Board. I think this Board has to look at, under the regulations that are before this Board, and I want to specifically refer to regulation R 645-300-211. This Board has a broader purview than looking just at the Tank Seam. I think this Board has a broader responsibility to look at

whether the renewal or the issuance of this significant revision to the permit will, has or will adversely affect the water users that are here today.

And I, you know, I respect the comments of the Board and the opinions of the Board on this, but I have to also respectfully point out that the purview and the requirements to review this are broader than that. And if the granting of this significant revision will have any adverse impact, then that's what this Board needs to look at, not whether one aspect of it, the Tank Seam, is going to have an adverse impact.

It's been put into evidence, Mr. Chairman, that this will extend the life of this mine for three additional years beyond the current life. That the water discharge will continue throughout the same working, same mine. And so I respectfully point out the Board has to go beyond what's in the Tank Seam itself, and look at whether the issuance of this permit will have an adverse impact. And that's the charge of this body, and we submit that it does. Obviously this is argument, but that's my answer to your question.

MR. LAURISKI: I guess that's where I'm at a loss, and correct me if I'm wrong, but your petition for review was for review of the significant revision to the permit which allowed -- which allows Co-Op to extend

their mining activity in to the Tank Seam.

MR. SMITH: That's right.

MR. LAURISKI: Your petition for review has not requested a review of the permit for mining in the Blind Canyon Seam within the permit boundaries. Now, to the extent that mining the Tank Seam impacts the hydrology of the aquifer, Big Bear and Birch Springs, I guess that's where I seem to be focused, and perhaps I'm -- perhaps I'm wrong. But when I look at your petition for review, it seems to go very directly toward the significant revision of the permit which is very narrowly focused to the Tank Seam. However does this get us to that point, and explain to me if you would, how we can broaden our look at the permit that was granted for the Blind Canyon Seam in 1991, that's now a final order of this Board, and now go back and review that?

MR. SMITH: Well, I think you need to do that for several reasons. First --

MR. LAURISKI: Tell me how we can do that legally.

MR. SMITH: And I -- let me attempt to do that, Mr. Chairman.

First, as you pointed out, a permit was issued in 1991. From the very own records of Co-op, that are here in evidence, they have asked to be put in evidence

today, it shows since 1991, there has been a dramatic and significant increase in water discharge from that mine.

MR. HANSEN: Objection.

MR. LAURISKI: I've asked a question.

MR. SMITH: When we went through this --

MR. LAURISKI: I'm not a witness at this point.

MR. SMITH: Yeah, and that's in the PHC that talks about where it went from a fairly dry mine, to an extremely wet mine, to now where it's discharging, even under the latest figures, in excess of 100 gallons a minute. We think that's an extremely great amount of water because it's three times what Birch Spring is producing, and what is being produced from Big Bear Spring.

And so, that's one thing that's different. I don't think that that's -- that was ever determined. That's new information that happened since 1991, and to claim that was determined in 1991, this is information that's developed since then, and is in their new data, that's before this body at this time and is the scope of review. I think that's the question.

You are saying how can we have the broader scope of review? Do we have the power to look at anything more than just the Blind Canyon, the mining up in Blind

Canyon? This is all being mined through the same mine. It's all the same water discharge that's happening now, is going to continue to happen as this mine operates. The only thing that's going to stop this is when this mine quits operating. That's the only thing that's going to cause this interruption.

And it says, as I pointed out in the regulations that this Board operates under, for review of a permit, granting of a permit or approval, permit for Co-Op Mining reclamation, operations permit change, renewal, or transfer or assignment of sale of permit rights, the applicant, permittee or any person with an interest which is or may be adversely affected may request a hearing.

We're going to be adversely affected if you grant this permit and allow this mine to keep operating for another six years.

MR. LAURISKI: And that's I guess my question. How do you say you're going to be affected by mining in a Tank Seam? That's what I'm driving toward. Where does the significant revision for mining the Tank Seam impact the water user?

MR. SMITH: It impacts in several ways. One is --

MR. LAURISKI: I'm going to do this. Without having to go into all your closing arguments, I think that's

where we're having some real difficulty as Board members, and we want to provide the opportunity for everybody to be heard. But we see the scope, I guess, and we've had discussions that our scope seems to be directed toward a significant revision. The petitioners in this case haven't asked us to look at the permit that was granted in 1991, toward the Blind Canyon Seam. The petitioners have asked us to review the significant revision for the Blind Canyon Seam. The mining of that tank canyon seam impacts what's happening in Blind Canyon seam and the aquifer, and we understand that. My question is how do we get there?

MR. SMITH: I think we get there through several things. One is anyone who is adversely impacted, and that's us, we believe.

MR. LAURISKI: I understand that.

MR. SMITH: The mine will continue to operate, continue to operate the same, and discharge water in the same method as it's discharging water now through extending the workings into the Tank Seam. We believe there will be water found in the Tank Seam. But whether or not water's found in the Tank Seam, we don't think the Board can take that narrow of a view of this situation, because it's not only whether you may be impacted in the future. And there's important, although

somewhat subtle language, that says anyone who is or may be adversely affected may request a hearing. It doesn't say only those persons who may be, only those persons who may be adversely affected by what the future activities are. But if you are being adversely affected you have a right to request a hearing and that's the scope of review.

And I spent several hours carefully looking through the regulations that govern this Board and govern the Division, and found nowhere in those regulations, and if I'm wrong I'm sure someone here will correct me, nowhere it says if you look at a significant revision you only look at those aspects of the revision that are new. You look at also the aspects of how the mine will operate under that significant revision.

This is going to extend the life of this mine, this is going to continue to have water move out of the mine, and be pumped out as it has been pumped out. And we think that's within the purview of this Board because we are saying we are being adversely affected, and that's within the scope of this regulation when this came up for this significant revision.

MR. LAURISKI: I'm with you, thank you very much. Go ahead and finish now.

BY MR. SMITH:

Q. Mr. White, can you, in looking at this, I think this is exhibit --

MR. LAURISKI: This may be a good -- I hate to keep doing this to you Mr. Smith, but I extended your discussion beyond the five minutes I was hoping you were gonna finish. We'll take a break. There's a few of us that need to stand up and stretch. We'll reconvene at 3:00.

(Whereupon a recess was taken.)

MR. LAURISKI: All right. We'll go back on the record. We're going to go ahead and let you proceed, and we've noted your comments relative to what this Board should be considering, and it will consider all the evidence when we recess to consider this case. So, if you want to go ahead Mr. Smith, you may proceed.

MR. SMITH: Thank you, Mr. Chairman.

Q. Mr. White, I'll show you what's been marked I think as Exhibit 15. You've seen this before. You were here?

A. Yes.

Q. It's a chart of some flows of Birch Spring and Bear -- you can just ignore Little Bear Spring, the one that's marked in red. I just was wondering if you have an explanation for the decline in flows in Birch Spring and Big Bear Spring that occurred over the period of

time that's shown in Exhibit 15?

MR. MITCHELL: Your question is looking only at that chart. Does he have an explanation for what's going on?

MR. SMITH: Well, I --

MR. MITCHELL: Or are you asking general knowledge?

MR. SMITH: Based on general knowledge. This is representative of flows, and it shows there's been a decline in flows over the last few years, and we've had testimony as to that before. And my question is just whether he has an explanation, based on his work that he's done for Co-op Mine, as to what may be the cause of the decline in flows in Big Bear and Birch Spring.

A. We evaluated flow data from the Springs and the precipitation data somewhat similar to what you have in that exhibit. And it's my opinion that the flow from the Springs has been influenced by a decrease in precipitation in the area.

Q. I'd like to show you Exhibit 16. It shows the precipitation. This is a shorter period of time, 1989 to 1994, and it shows some spiking in the precipitation, and not the spiking in the Birch Spring. Any explanation or why Birch Spring doesn't seem to be responding to increases to precipitation?

A. Yes. I think the problem -- which exhibit is

this?

Q. This is 16.

A. And the other one was 15?

Q. Yes.

A. I think the problem that you have in looking at Exhibit 16 compared to 15, 16 is a presentation of monthly flow data, I believe, and monthly precipitation data it appears, whereas Exhibit 15 is a presentation of annual data. In our valuation of the data, we came to the conclusion that the response time for the springs to respond to a change in precipitation was typically on the order of two or three years.

So to evaluate monthly data, it becomes difficult. You're looking at a data set where the time frame is shorter than what the response time is going to be, so it becomes more instructive to look at things on an annual basis, and see what's happening annually, since that response time tends to be a fair amount slower.

Q. But back to Exhibit 15, which is on an annual basis, which you suggested, looking at Birch Spring which is in the yellow here, there doesn't appear to be any response to any increases in precipitation in Birch Spring at all?

A. Sure, but I think you're looking at a -- the only -- hold that up. When was that increase? Looks

like in 1993, from '92 to '93, you had the increase in precipitation, and then you've only got one year of data after that in Birch Spring. Also, one thing you need to recognize in evaluating the data, we have been through a period, as you can see from the precipitation graph, we've been through a period of rather extensive drought for the last several years. Your normal response time also is assuming that you have pretty much an equilibrium of conditions in the hydrologic regime that you're not having to put a lot of that excess water into storage.

Since we've gone through a period of rather prolonged drought, increased precipitation now is that snow melts and as the water percolates into the ground, a lot of that is going to go to satisfying the lack of soil moisture that's in those upper layers. And so at this point a lot of the water that would normally go down and recharge a deep system isn't going to get there because everything above that point is so dry.

But, again, that increase in precipitation at the end, we only have about a year's worth of data after that. And as I indicated earlier, the response time that we had seen before for other springs in the region, were longer than that time frame. We're typically looking at two or three years as opposed to just a one

year response time.

Q. But during that same period of time, the water encountered in the mine was increasing, and I assume it's recharged by the same precipitation?

A. Well, again, as was discussed I think in the last hearing, the primary area for recharge is, and as we have talked about somewhat here, the primary area for recharge is, in my opinion, to the north of the permit area a fair ways. And so, yeah, there is recharge that's occurring to the -- from water percolating down through the stratigraphic column. Most of the recharge to the Black Hawk Formation may well be coming from what's percolating down through areas right above it, that's why that water tends to be much older. Recharge to the units of the Star Point Sandstone that are on the east site of the Blind Canyon fault, appears to be coming probably back from that shatter zone where recharge is going to be much more rapid. And so, any time that you've got -- you have recharge from precipitation, this is the response that you see out at the spring or response that you see in the water levels in the monitoring wells, is just a pressure response.

The two year or three year time frame doesn't mean that two years after the water hits the water table, that drop of water is now discharging at the spring, it

means it takes that two or three years for that pressure response to make its way through the water table. And if you've got a condition of prolonged drought where the pressure in the system is significantly lower, then it's going to take longer to build that back up until you can see that response going through, because so much of that water goes to recharging the storage conditions in the aquifer.

MR. SMITH: That's all the questions I have.

MR. LAURISKI: Mr. Appel?

MR. APPEL: Thank you.

Q. You mentioned that you'd had additional experience in this particular area, with respect to the hydrogeologic investigations. Have you worked in any other mines?

A. Yes.

Q. What were they?

A. I've worked at Genwal, coal mining operations at the U.S. Fuel Operations, at Utah Fuel Company Skyline Mine, Suffco (sic) operations down in Salina over at Andalex, at the Horse Canyon operations in Sunnyside, Soldier Creek Coal Company operations in -- up Soldier creek Canyon. Those are what come to mind.

Q. And that was hydrogeologic work?

A. Yes. The work that I've done included both

groundwater investigations as well as design of surface run off and sediment chrome faults, surface water issues.

Q. Is it fair to say you have had a chance to rely upon much of the literature that has been mentioned in this hearing?

A. Yes, I think that's fair.

Q. Including Mr. Lines?

A. Yes.

Q. Since water is one of your main subjects, maybe you can answer this question for me. Do you know what water they're going to use, or actually how much water they're going to use in the mining of the Tank Seam?

A. I would assume that the water use would be somewhat similar in the Tank Seam, compared to what has been used recently in the Blind Canyon Seam. It's, as far as I know, the mining methods are going to be somewhat similar, so I would expect it to be -- the usage to be similar.

Q. How much is that?

A. Currently it's my understanding they're using between 10 and 30 gallons a minute of water in the Blind Canyon Seam.

Q. What's the source of the water they're going to use to mine the Tank Seam?

A. Water that flows into the Blind Canyon Seam, it's my understanding that that water will be utilized for mining up in the Tank Seam.

Q. So they'll pump it up to the Tank Seam?

A. That's my understanding.

Q. So that's an introduction of new water into the Tank Seam?

A. Yeah, probably is.

Q. Do you know if they made any filings with the state engineer's office to change points of diversion?

A. I'm not aware of that.

Q. Do you know where that water is going to go once it's released into the Tank Seam?

A. The water would be used for dust suppression and general uses within the mine. What's -- what little bit accumulates would probably eventually seep back into the ground and make its way vertically downward.

Q. Through the fractures and joints and cracks?

A. Through the formation. I don't know what extent of the fractures and joints is throughout the Tank Seam. But it will make its way down through the formation. What typically happens in the Black Hawk Formation is that water percolates vertically until it hits a less permeable layer, a shale or silt stone in the Black Hawk, and then accumulates on top of that

creating your perched layers.

This water would follow that same type of a path, I would assume, and accumulate in perched layers similar to what other water would be expected to do.

Q. In the course of preparing your report, have you specifically dealt with where this water will go?

A. No. I mean we felt like it was our opinion that there would not be -- they're not going to be pumping an excess amount of water in to the mine, they are pumping the amount of water they need to the mine, and they are not going to be pumping an excess that's going to have any place to go. The worse case condition, you could say that all of the water is incorporated in to the coal and gets hauled out of the mine with the coal. And that the net loss of water from the system in the worst case condition is the amount of water that's actually used in the mine, that 10 to 30 gallons a minute.

Q. Well, that's your best case, I think. The worse case is that it's not all absorbed and begins to move down in to the strata, isn't that correct?

A. No, or I wouldn't have said that. The worse case as far as the loss of water, is that it all goes out with the coal and you lose 10 to 30 gallons a minute.

Q. Okay. Maybe we're approaching this from a different angle. My greatest concern -- excuse me?

A. It appears to be so.

Q. You're sense of humor is still intact.

A. It is.

Q. My concern is that the contaminants created by this mining are going to move downward with the water; isn't that a possibility?

A. All things are possible. I believe though, again looking at the current mining operations, looking at the data, the discharge data coming from the mine, the data indicates to me that the mining operation is not adversely impacting in the Blind Canyon Seam. The mining operation is not adversely impacting the quality of the water. Therefore, from that I would conclude that similarly mining in the Tank Seam would not adversely impact the quality of the water since the mining methods are going to be similar.

Q. But it is true that any water that is not absorbed into the coal will migrate downward, it will not be removed from the mine?

A. That's true.

Q. With the coal?

A. That's true.

Q. So any contaminants fixed to that water will

move downward also?

A. To the extent that -- to some extent yes, depending on the contaminant. If you're dealing with a -- for instance an oil and grease contaminant, those constituents tend to be absorbed onto the materials, particularly as you go through the fine grain sediments that are typical of the Black Hawk Formation. And so some of those contaminants, if they occur, are going to be absorbed and will never make it down to some greater depth.

Q. But it's fair to say that any time the amount of water exceeds the absorption capacity of the process, that water will be liberated and could flow downward?

A. Yes, that's true.

Q. Okay. Do you know what Co-op does with human waste generated by the miners?

A. I'm not sure.

Q. I want to talk to you a little bit about water interception because the one thing I think we can all tell is water is intercepted. And I've gone through some of your documents, most of your documents, and I want to ask you some questions that I think are conclusions based within that. And believe it or not I'm not trying to trick you, I'm just trying to help the Board and everyone understand the fundamentals of your

geologic conclusions here?

A. Okay.

Q. Your drilling has shown three distinct aquifers with individual static water levels within the Star Point Sandstone.

A. That's correct.

Q. They're not all fully saturated, are they?

A. The individual tongues? Is that what you mean?

Q. Yes.

A. Yes, that's correct.

Q. So they're not full?

A. Yes. That's correct.

Q. In layman's terms?

A. Yes.

Q. Are you familiar with drill holes one through three?

A. Yes.

Q. Are you familiar with the length of the core in drill holes one through three?

A. Off the top of my head I can't remember, but as I recall, there are some data that are presented in the various exhibits. But there has been -- I believe one of them, I think it was drill hole one, was continuously cored, and the other drill holes were cored in sections.

Q. I'm not going to ask you any specific questions, just a couple, so if you'd like to refer to the document, that's more than fair because I think it explains itself.

How deep did you drill the holes?

A. That one I can't answer.

Q. Let me ask you an easier question. Did you drill down to the main member of the Mancos Shale in each hole?

A. In each hole we went through -- yes, we encountered what we felt was the terminal Mancos Shale, the primary section of the Mancos Shale based on our review of geologic literature in the area and our review of outcrops, and what we felt the sequence of the sandstone tongues was going to be like within the Star Point Sandstone. We knew there was a reasonable potential for encountering three tongues if they existed if the parts were there. And so we felt like the portion of the Mancos Shale that we bottomed each hole in, we felt like that was the main body of the Mancos Shale.

Q. That's important because that's really the ultimate contact for water, water will --

A. Yes, that's going to be the basement, if you will.

Q. Okay. That's what I was after. Now, you may have drilled your holes that deeply, but in fact you don't monitor all the way down to the Mancos Shale, do you?

A. The monitoring wells were not completed in each case down there. What we did was as the holes were drilled, we would get in to a zone where we were encountering one of those shale lenses, and we then tested each tongue of the Star Point as we drove down, so we could gather data from each tongue separately, where we could gather water level data, water quality data, and also determine what the hydrologic conditions of that tongue were.

Then we would advance the hole down in to the next tongue and do the same thing. Once the holes, once we were done with the drilling operation, then each hole was completed just in one of those tongues. Rather than completing each hole in all three tongues, we chose one tongue to complete them in, but gathered data during drilling from each tongue.

Q. So, each drill hole monitors one section of the Star Point?

A. That's correct.

Q. Okay. How far apart are these drill holes, generally speaking?

A. There's a map in Exhibit D, Figure 3-1 that shows the locations of the drill holes. It would appear that drill hole 1 A and 3 are about a thousand feet apart, and 1 A and 2, are about 2000 feet apart.

Q. So you have one hole to determine how the hydraulics within the Panther Tongue perform?

A. No. Again, we tested, as we drilled down, we tested each zone individually in each hole. So, out of each hole we gathered data from all three tongues. We gathered water level data, water quality data and aquifer characteristics data. Then, when that data gathering process was finished, we completed each hole of the monitoring well in only one tongue.

Q. That's what I'm saying. While you did achieve one time results --

A. Yes.

Q. -- in each hole, your continuous monitoring is only one hole in each of the three subsections of the Star Point Sandstone?

A. It was pointed out to me in the -- during the recess that I made a mistake in my earlier testimony, that in fact all of those drill holes are completed in the, I believe it's the Spring Canyon member. They are completed in the shallowest member of the Star Point Sandstone. So we have the three, the object being to

monitor groundwater conditions in the aquifer that immediately underlies the coal seam that's being mined, and that was the upper most aquifer that we encountered. So in each of those the monitoring well portion of the hole was completed in that upper most aquifer.

Q. In fairness, though, one hole in the lower members isn't telling us very much about how that water is moving within the entire, for instance, Panther Tongue, is it?

A. In fairness that's not what occurred. Again --

Q. I'm sorry?

A. That's not what exists. Again, and undoubtedly the problem is that I hadn't understood when I answered Mr. Smith's question earlier. Earlier I'd indicated that each hole was completed in a different -- the monitoring well was completed in a different tongue. During the break, I was reminded that that was not the case, that each hole in fact was completed in the Spring Canyon member of the Star Point Sandstone.

Q. Which is the upper most?

A. The upper most. So we have three holes completed in the same member, as opposed to being completed one hole in each member. And again, during drilling, we obtained data from each hole in each

member, so we have, out of the three tongues, we have three data points from each hole. And then in the end as the monitoring wells were completed, those were all completed in the same Spring Canyon member so the long term data will be obtained from the zone that immediately underlies the mine workings. The idea being that that's going to be the aquifer that is affected first by mining operations if there is any impact, so that's the one you want to monitor.

Q. Okay. That tells us a little bit about your methodology, but the conclusion is still correct, you have one monitoring well in the Storrs --

A. No, again --

Q. Not the spring, the Storrs?

A. We have three monitoring wells in the Spring Canyon Tongue.

Q. But that's the upper most?

A. Yes.

Q. Of the three, I said the Storrs?

A. We have none in the Storrs, and none in the Panther.

Q. Thank you very much. So really we don't know how the water is moving?

A. Yes, we do.

Q. On a continuous basis?

A. As I indicated earlier --

Q. You have to let me finish my question.

MR. LAURISKI: Let him finish the question.

BY MR. APPEL:

Q. Do you have any continuous monitoring in the Storrs --

A. No.

Q. -- Formation?

A. No.

Q. Do you have any intentions to monitor in the Panther Tongue?

A. No.

Q. Thank you.

A. You're welcome.

Q. Would you agree with me, that the Birch and Bear Springs issue, essentially from the contact between the Mancos Shale and the Panther Tongue are the Star Point Formation?

A. That's correct.

Q. And they're the only springs of note that issue from that contact in the vicinity of this particular mine?

A. That's correct.

Q. Let me ask you this. Have you investigated the cliff face in Bear Canyon?

A. I have not personally.

Q. Have you read any reports of the cliff face where the Storrs Formation and Spring Canyon Formation, as they exit into that canyon?

A. I can remember there being some discussions in the documents, some of the documents concerning that cliff face above the -- above one of the springs. I can't recall if it's Birch Spring or Big Bear, and I remember the discussions at the hearing, the last hearing, where there were discussions of some of the cliff faces.

Q. But there are no springs that issue in the cliff face in Bear Canyon from the Storrs Formation. It's easier for her if you don't talk at the same time.

A. Excuse me.

Q. The Storrs Formation or the Spring Canyon Formation of the Star Point?

A. As I understand there is seeping that occurs.

Q. I said springs.

A. It's a matter of semantics.

Q. It's not a matter of semantics.

A. Would you define the volume then.

Q. Something of the level of flow of Birch or Bear Canyon.

A. That's correct, there are no springs of the

level of Birch Spring that issue from the Storrs or the Spring Canyon member.

Q. Thank you. I think it would be fair to summarize your testimony, and I know you will tell me if this isn't fair, or correct me one way or the other, that the entire area suffers from significant fracturing and jointing?

MR. HANSEN: Objection, ambiguous as to what significant means. Needs clarification.

MR. LAURISKI: You can answer the question Mr. White.

THE WITNESS: There is a lot of jointing and fracturing in the area, yes.

BY MR. APPEL:

Q. And you've testified that because of that, water moves downward through these various layers?

A. I don't believe I testified that it moved downward, but I did say that it does at least move laterally.

Q. I think you also testified it moved vertically?

A. That's back up in the shatter zone, yes.

Q. Will it also move vertically in the area above the Blind Canyon Seam and the Tank Seam?

A. Any place there is a -- that there's a fracture encountered, if the formation at that point is

saturated, water will move vertically through that fracture. Assuming that the fracture has a significant aperture on it, you can get water into it, that it's not sealed tight as sometimes occurs as you get in to the bedanetic (sic) mudstones and shales that occur in the Black Hawk Formation as well as in the tongues of the Mancos Shale.

But typically you're correct, that the fracture tends to be the point of least resistance so it's easier for water to flow through fractures as opposed to unfractured bedrock.

Q. On that basis could a drop of water on the top go down, move through the entire stratigraphy to the Mancos Shale?

A. If you had a fracture that was that continuous, that assumption was correct, then yes, that would occur. I know of nothing that would indicate that that assumption is correct though.

Q. Well, the entire area is regionally fractured, isn't it?

A. Yes. And I believe back up in that shattered zone you may have that sort of a condition. But to infer that condition occurs through the Black Hawk Formation in the area of the permit area, I think that's not a correct -- I don't think that's a safe assumption

to make.

Q. Well, isn't it equally likely?

A. No, I see nothing in the geologic data that suggests you have fractures that are vertically extensive in the area of the permit area that would go from the mountain top down into the Blind Canyon Seam. That should have a single fracture that would do that.

Q. Okay. That's our problem because I'm not asking for a single fracture, but because they are connected as you've testified before, many of these are interconnected, are they not?

A. Yes.

Q. So it may move vertically some point and then laterally?

A. That was my misunderstanding, I'm sorry. Yes, there are. Any place there are fractures you get vertical flow. The amount of that flow is going to be a function, of course, of the amount of water that's supplied to the fracture in the area that overlies the permit area. The bulk of the land surface above the permit area is rather steep, it's predominately outcrop in that area, the Black Hawk Formation, and it's very difficult for water, for any significant amount of water to percolate down through that type of a situation where you have a steep area that experiences rapid run off.

No area really for the water to pond and to percolate down through. Most of the recharge in the area typically occurs back in the -- along the Wasatch plateau to the north of the permit area where you have the North Horn Formation that does outcrop in an area that's remote from the permit area.

Q. Okay. Another hopefully true or false question. As mining has moved back into the mountain, water has been encountered in increasing volumes, true?

A. Yes, that's true.

Q. Now, this is where I think we differ, or you and Mr. Montgomery would differ. Your basic assumption is that is because you are encountering perched aquifers as you move back into the mountain, correct?

A. Yes, that's correct.

Q. His assumption is that you are mining in to the potentiometric surface which would be the regional aquifer; correct?

A. That's my understanding of what his understanding is. Yes.

Q. But that's really where we part company, isn't that right?

A. It would appear if that's your opinion, then yes, that is different than my opinion.

Q. Would you like to translate that into English?

You don't need to answer that one.

It appears the reason I'm saying that is it appears we have essentially the same facts before us, but reaching diametrically different conclusions; is that right?

A. I would definitely say the same facts were available to both of us. You know, everything that we've got here, that our exhibits are basically in the public record, so that's probably a safe assumption.

Q. But your theory requires that you intercept perched aquifers all the way back through the mining rather than the potentiometric surface; is that correct?

A. That's correct.

Q. If it was the potentiometric surface you're intercepting, then you could be affecting the flow of these two springs, correct?

A. I don't think so. Again, because the Panther Tongue which is the source of the water to both Birch Spring and Big Bear Spring is hydrologically disconnected from the Storrs Tongue and the Spring Canyon Tongue. If we're in a situation -- if we didn't have this separation of aquifers within the Star Point Sandstone, then that assumption might be correct. If we had one continuous Star Point aquifer down there, and we're mining into the water table that was feeding that

aquifer, then yes. Anything we encountered would be diverted away from those springs.

However, the data we obtained during the drilling of the holes from the Blind Canyon Seam down in to the Star Point Sandstone indicated that those three aquifers, those three tongues were not hydrologically connected, so even if we were mining in to a water table, it would be, which I don't think we are, but if that was occurring, it would be a water table associated with the Spring Canyon Tongue, not a water table associated with the Panther Tongue. And so we would not be moving water out of the source of recharge to Big Bear Spring and Birch Spring.

Q. But you previously testified that in this smaller region called subregion, we have coextensive fractures, joints, and certainly you've mentioned some very large faults. And it appears to me that these are connected. And the reason I say that also, is because you previously testified that these shale tongues, the Mancos Shale tongues are discontinuous in certain areas. I think the word you used was they were not aerially that broad, and that they would thin, and then become thicker and in some places become --

MR. HANSEN: I haven't heard a question in this and I ask he confine his closing argument to closing

argument. If he has a question, let's get to the question.

MR. LAURISKI: Well, I think that's where he was headed. Go ahead.

BY MR. APPEL:

Q. I prefaced it, it was a question -- it seems every time I ask a hard question I get an objection.

Do you remember that question per chance?

MR. LAURISKI: Why don't you restate it.

BY MR. APPEL:

Q. I'll try to break it up, that way we should be able to deal with Mr. Hansen's objections.

Didn't you testify that these Mancos Shale tongues which interlineate the Star Point Sandstone are laterally in some cases discontinuous?

A. Yes, that's correct.

Q. So they don't exist in certain areas?

A. That's correct.

Q. Okay. In those areas water would pass freely if there were joints and fractures, correct?

A. Through the Star Point, that's correct.

Q. That's correct. And in fact, when these sandstones fracture, if it's a thin layer of Mancos Shale, that will fracture too, won't it?

A. At some point, you're correct, that the Mancos

thins out to the point it become hydraulically insignificant.

Q. Okay. So water can pass through the Star Point members, through fractures and joints?

A. In some locations, yes, but not beneath the permit area. The data we have beneath the permit area indicate that at least in that area, these tongues seem to be laterally continuous.

Q. And that data is based upon three drill holes?

A. That's correct.

Q. A thousand feet apart?

A. 3,000.

Q. 3,000?

A. I indicated two of them were a thousand feet apart and two of them were 2000 feet apart. And the distance from one to the other is three.

Q. Operating as a scientist, would you be more comfortable making that conclusion if you had five or six more drill holes that showed you that?

A. Of course, yes.

Q. Okay.

A. One never has enough information.

Q. I recognize that. Do you think that the mining of the Blind Canyon Seam has changed the underground hydrology of the stratigraphic sections?

A. I don't believe that mine in the Blind Canyon Seam has impacted the hydrologic conditions in the members of the Star Point Sandstone that feed the Bear Canyon Spring and Birch Spring. I do believe mining has encountered perched groundwater in the Black Hawk Formation so there has been some water in the Black Hawk that's been encountered, but I don't think that is water that was or would have normally flowed into either Big Bear Spring or Birch Spring.

Q. Well, and you recognize I don't agree with that conclusion, but in fact you are intercepting and taking it out in an entirely different place than would have occurred before mining, isn't that true?

A. Well you're taking it out the --

Q. Mine portal?

A. The portal. That water that would have discharged out of the -- out of the Black Hawk Formation would still have exited somewhere on the face of the mountain. It's just that what you're doing now is pumping it out the portal instead of allowing it to reach the face of the mountain alone.

Q. That's an awful lot of water isn't it?

A. That's a relative term.

Q. Of course it is, it's relative to the size of the springs. Were you here during some of the

historical testimony at this hearing?

A. Yes.

Q. Recognize that those people testified they never saw springs coming out of the cliff in these formations?

A. Yes, I remember that.

Q. And that the two springs, Birch and Big Bear are two large springs?

A. Yes.

Q. I want to be careful with the scale with you because it's very important.

A. I remember that. Well, now, would you go back through that. Didn't you say that I do remember that people testified that they saw seepage out of the face of the mountain?

Q. Your people testified to that.

A. No, I think your people did too. As I remember, there was some people from the water companies who testified of ice that had formed on the face of the mountain, and other conditions.

Q. So you know, that's the ice that occurred once Co-op dumped water into that section of the mine.

MR. HANSEN: Objection.

MR. APPEL: That's how that testimony came in.

THE WITNESS: I don't recall that part.

MR. LAURISKI: I'll sustain that one.

MR. APPEL: I understand that took -- it's true though.

Q. All supposed levity aside, where did the water that's coming out the portal go before there was mining?

A. Any water that's encountered in the underground workings would have naturally either discharged to the surface, or would have remained. Some of that is going to remain in place as a result of just long term storage of that water, water that is eventually going to discharge.

It's my opinion, that based on the work that I have done in the region, and evaluation of discharges of water from the Black Hawk Formation, and evaluation of other mining operations, it's my opinion, that flow in the Black Hawk Formation sandstone predominately controlled by the presence of the confining perching layers that are present throughout the Black Hawk, that that basically forces the water to flow laterally to the extent of that perching layer. And you get, as a result, seepage that occurs at the mountain face. You get seepage that's going to occur out of a sandstone lens, typically from the Black Hawk Formation where it overlies some perching layer.

That seepage can occur over such a broad area it becomes very difficult to define it as a spring, and in fact in most cases you can't define it as a spring. Specifically if you say a spring has to have at least 20 to 30 gallons a minute of flow.

Q. I'll stop you at some point because you're not really answering my question --

A. Okay.

Q. -- at this point. The two main exits for water historically, as far as you're aware from that cliff face, or those cliff faces, is the Birch Spring and Big Bear Spring without this portal in place, correct?

A. Those are the main Springs in the area. Those are not the only areas of seepage, but those are the main springs.

Q. Okay. Thank you. You gave us some testimony concerning the effect of the Blind Canyon fault. Are you aware of the existence of geologic mapping of a subfault or branch fault of the Blind Canyon fault that intersects Birch Spring?

A. I would have to look at the map.

Q. I would think that would be fairly important if it's connected to a major fault you are saying is blocking the transmission of water.

A. Yes, and I would be glad to look at the map, if

you'd like to.

Q. Okay. Presuming the existence of such a branch fault, would not the water intercepted by the main fault move down?

A. I can't say that. I'd be glad to look at the map and we could evaluate that. That's -- as I indicated earlier, all things are possible and I believe that's a possibility.

Q. But your testimony was that Birch Spring couldn't be affected because it was 800 feet away from the Blind Canyon fault?

A. And concurrent with that, my testimony was the Blind Canyon fault itself, regardless of whether it's acting as a conduit or as a barrier, would tend to divert water away from Birch Spring as opposed to toward it. I'm not aware of that splinter fault that you're discussing, so I'd have to look at the map before I can pursue that.

Q. No one brought that to your attention during the course of your review?

A. I'm afraid not.

Q. Okay. In any event, the Blind Canyon fault wouldn't have the same impact on Big Bear Spring, would it?

A. No, that's correct.

Q. And directly up gradient from the Big Bear Spring is the Co-op Mine, correct?

A. That's correct.

Q. You don't have the same argument concerning the effect of a fault with respect to Big Bear Spring, do you?

A. That's correct.

Q. So anything that happens above, in that mine above could conceivably affect Big Bear Spring?

A. That's incorrect.

Q. Why is that?

A. I've stated my opinion that I do not believe that the workings, that the mine workings are hydraulically connected to the Panther Canyon Tongue of the -- to the Panther Tongue of the Star Point Sandstone.

Q. And that's because of your assumption that those interfingerings of Mancos Shale would interfere with that?

A. That goes into that conclusion, as well as the water level data which were collected from the holes that were drilled into the Panther Tongue, as also including the water quality data that were collected from the Panther Tongue from the overlying tongues.

Q. Your three drill holes?

A. My three drill holes as well as the Tritium data which reflected -- which indicate that the water encountered in the mine is of a significantly older age than the water that's being discharged in to Big Bear Spring.

Q. Okay.

MR. APPEL: I think that's all I have.

MR. LAURISKI: Thank you. Any redirect, or I guess Mr. Mitchell?

MR. MITCHELL: No questions.

MR. LAURISKI: Anything on redirect?

MR. HANSEN: No.

MR. LAURISKI: Thank you Mr. White. Any further witnesses, Mr. Hansen?

MR. HANSEN: Co-op mine has no further witnesses.

MR. LAURISKI: Mr. Mitchell?

MR. MITCHELL: I have one.

THOMAS MUNSON

was duly sworn, was examined and testified as follows:

BY MR. MITCHELL:

Q. Would you please state your name and working address for the record?

A. Tom Munson, I work at the Division of Oil, Gas

and Mining, 3 Triad Center.

Q. Who are you employed by?

A. State of Utah Department of Natural Resources.

Q. Working for?

A. Working for the Division of Oil, Gas and Mining.

Q. And what are you employed as?

A. My official title is reclamation specialist three, but I'm a hydrologist. That's a general term,, reclamation specialist in that category and I am a hydrologist.

Q. Have you ever heard of -- have you been here for this whole hearing?

A. Yes, I have.

Q. Have you ever heard of the Co-op mine and Bear Canyon mine?

A. Yes, I have.

Q. Are you familiar with a Division finding regarding the Tank Seam significant amendment?

A. Yes, I am.

Q. Are you familiar with the section of the Division's findings dealing with water?

A. Yes, I am.

Q. Why are you familiar with it?

A. I made that finding.

Q. And in what capacity did you make that finding?

A. As a hydrologist reviewing the Tank Seam amendment, I was responsible for making the finding of no significant impact to the hydrologic balance.

Q. Tell the Board what your educational background is?

A. My educational background, I have an associate's of arts and science from Paul Smith's college in Up State New York and environmental technology. Graduated 1975. I graduated from Utah State University with a degree in water shed science in 1979. I also have worked two years for the Forest Service as a hydrologic technician; for Dames and Moore Environmental Consultants in Florida. I worked from 1980 through 1982 when I became employed at the Division as a hydrologist in 1982, and have worked here since 1982.

Q. Have you always worked in the capacity of a hydrologist?

A. Yes, I have.

Q. Have you ever reviewed mine plans, requests for permits, revisions, amendments to permits?

A. Yes, I have.

Q. How many would you guess, round numbers?

A. I would have to put it in the hundreds.

Q. The step by which -- steps by which this process takes place, in this case, my understanding is this was called a significant amendment; is that correct? Revision, excuse me.

A. That's correct.

Q. And when there's a significant revision, does that mean there's already a permit in place to do something?

A. Yes, that's correct.

Q. What is it that's being revised then?

A. It's a revision. A significant revision is I believe, when you impact -- that's not just a minor, there's a minor amendment of the significant revision. As far as making that determination, it's based on the amount of, like in this particular situation, they're mining a whole new seam so it was a significant revision to the existing Bear Canyon permit, which already has permitted the Blind Canyon Seam and the Hiawatha Seam or mine.

Q. Prior to the issuance of the original permit for the Blind Canyon Seam, was there any hydrological data submitted for the issuance of that permit?

A. Yes.

Q. And is that what's called a PHC probable hydrological consequence information?

A. Correct.

Q. And before you make a finding granting them a permit, does the Division have an obligation to do anything with that document?

A. It has an obligation to review it to make sure that all the baseline data is collected in a manner which is appropriate to make what we consider cumulative hydrologic impact assessment.

Q. That's called a CHIA, right?

A. Yes.

Q. Now the CHIA, that's something you're required by law to do before you can issue a permit; is that right?

A. Yes, that's correct.

Q. And it differs from a PHC how?

A. A cumulative hydrologic impact assessment or CHIA is a analysis of the data presented in a PHC.

Q. And does it take in to account other information beyond what was submitted by the operators sometimes?

A. It takes in to consider all the data available do the Division from any source.

Q. Would that include from other mines, mining in the same region and area?

A. That would take in to consideration mines,

federal, state agencies, any source of information that we could use.

Q. Prior to the request for the significant revision to mine the Tank Seam, had the Division reached -- issued a CHIA with regard to mining of the Blind Canyon Seam?

A. Yes, they had.

Q. And what was the result of that?

A. The result of that, there was a finding of no significant impact to the hydrologic balance outside the permit area.

Q. Now, have you ever been to any previous hearings where the water users that are protesting this revision today, have raised issues concerning the mining in the Blind Canyon Seam?

A. Yes, I have.

Q. And as a result of that, have you ever requested additional information of this operator?

A. Yes, I have.

Q. And what was the additional, what additional things have you requested?

A. Information that we requested was the three drill holes into the Star Point Sandstone, in addition to increased monitoring requirements of Big Bear and Birch Springs.

Q. In other words has it been brought to your attention previously?

A. Yes.

Q. That there was a concern on the part of the water users, that mining in the Blind Canyon Seam was having an affect on these springs; is that right?

A. Yes, that's correct.

Q. And you asked them to do -- you asked the mine to do additional things to attempt to determine whether or not that was a possibility?

A. Yes.

Q. Did you, prior to receiving the request for significant revision, did you receive this additional information from these three drill holes?

A. Yes, we have.

Q. Okay. Have you received any information either from the operator or from the water users, that changed your opinion concerning the underlying permit request for a significant revision, concerning the cumulative hydrological impact assessment that you reached when you issued the permit?

A. No, I haven't.

Q. When the request for a significant revision to mine the Tank Seam arrived, did you request information above and beyond, or in any way shape the nature of the

information that was created for that revision?

A. No, I hadn't, no I didn't.

Q. So, the information that was received for the significant revision was not an out growth of anything that had gone before, it was simply in terms of what you had requested of the mine previously. This is simply the information that was provided to you; is that right?

A. Yes, this is correct.

Q. Prior to the time, prior to the hearing as you say you've been at this hearing, where you've been for both days of the hearing, were you familiar with the petitioner's expert's theory of the hydrology as it relates to the mine and to the two springs?

A. Yes, I am.

Q. Have you heard anything today and the previous day that changes your understanding of the plaintiff's or the petitioner's expert's theory of what's going on?

A. No, I haven't.

Q. At the time you made the finding to, and made the CHIA finding that the requirements were met and there would be no interference, that they met the requirements of the rules regarding the collection of base ground and water surface data -- sorry, I just did a brain dump. Let me start over.

At the time you made this finding -- no idea where I

was going with that question. Just a minute. Could you read back the last question?

(Whereupon the requested portion was read.).

BY MR. MITCHELL:

Q. Do you understand the water users to have a different theory of the hydrology of the area concerning the springs in the mine from that of the mine, the --

A. Yes, I do.

Q. Do you view, in reaching your findings that they have met the requirements for the collection of data and the permit should be issued, does that necessarily mean that you have adopted one theory over the other as being more sound?

A. I would say that's correct.

Q. What is the basis for you having adopted the mine's data and conclusions over that of the conclusions of the water users?

A. Because the mine collected site specific data, specific to that area where the water users' information is more general in scope.

Q. Have you heard or reviewed any evidence specific to the area concerning the mine and the two springs that in any way causes you to question, or doubt the conclusions you've reached in your findings?

A. No, I didn't.

Q. I have no further questions.

MR. LAURISKI: Mr. Hansen?

EXAMINATION

BY MR. HANSEN:

Q. I show you what Co-op mine has marked as Exhibit A. Have you ever seen this document before?

A. Yes, I have.

Q. Can you tell us what it is?

A. It's the Tank Seam road revision.

Q. Did you have any input into the preparation of this document?

A. Not into the preparation of the document, but I reviewed the document.

Q. The first numbered line of this document, under the heading?

A. I'm sorry, maybe I'm thinking this is -- this is the Division's significant permit revision approval.

Q. Okay.

A. So if this is our document yes, I did. This is what we -- I'm just not familiar with the form, but yes, I did.

Q. Okay.

A. I would have made those findings.

Q. Numbered paragraph one says, the application is complete and accurate and the applicant has complied

with all the requirements of the state program, and then it has handwritten in "yes". To the best of your knowledge, is that true?

A. Yes, that's true.

Q. Section four states, "The Division has made an assessment of the probable cumulative impacts of all anticipated coal mine and reclamation operations on the hydrologic balance in the cumulative impact area, and has determined that the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area", followed by a handwritten notation, "yes". To the best of your knowledge is that a correct statement?

A. Yes.

Q. I offer Exhibit A into evidence.

MR. LAURISKI: Mr. Smith?

MR. SMITH: No objection.

MR. APPEL: No objection.

MR. HANSEN: No further questions.

MR. LAURISKI: Thank you, that will be entered. Thank you. Mr. Smith?

EXAMINATION

BY MR. SMITH:

Q. Mr. Munson, I want to ask you some questions, make some statement and ask if you agree or disagree

with my statements.

The recharge area for both the water found in the mine and the water for Big Bear and Birch Spring is the Gentry Mountain area?

A. Agree.

Q. Water moves downward and southward through the North Horn Formation, Price River Formation, Castlegate Formation, into the Black Hawk Formation which is where the mine is and the Star Point Sandstone Formation where the springs are, agree or disagree with that?

A. Agree.

Q. Faults and fractures are principal conveyances of the movement of water downward?

A. Agree.

Q. The water that comes out of the Big Bear and Birch Spring has moved through the Black Hawk Formation?

A. Disagree.

Q. Okay. Tell me why you disagree with that?

A. Basically all the testimony that Mr. White gave previously, I agree with. I agree with the fact that Big Bear and Birch Springs are hydrologically disconnected from the mine, and any sort of water that's contained in the Black Hawk Formation is typically perched, and as such is old water, connate water, found in discontinuous sandstone channels that tend to have

been formed in the swamps of the Black Hawk when the Black Hawk was being formed. That's very typical throughout the whole mining region, find it in almost every mine.

Q. I'm confused a little bit, I guess. So you're saying the water that comes out of the Big Bear and Birch Spring as never moved through the Black Hawk Formation?

A. No, I --

MR. HANSEN: Are we talking about generally through the entire area or within the permit area?

MR. LAURISKI: I don't think he defined one way or the other. He asked a question whether or not the water moved through the Black Hawk Formation.

MR. HANSEN: I think the question is meaningless unless it's narrowed.

MR. LAURISKI: I'll let the question be answered.

THE WITNESS: That would be an accurate statement, if you considered the fact that that's a very general question, and water could have moved through the Black Hawk Formation to get to Big Bear and Birch Springs.

BY MR. SMITH:

Q. I'm confused as to why you're hesitant. Obviously the water started out above all these formations, snow and rain, onto the Gentry Mountain

which you agreed with?

A. Yes.

Q. The Black Hawk is above the Star Point Sandstone formation; is that correct?

A. Yes.

Q. If it didn't move through it, how in the heck did it get down there?

A. Well, I'm sorry that you're dealing with a general conceptual view of how water moved down through that strata, and I agree with that, I don't disagree with it. I'll change my testimony if that's what you're getting at.

Q. I'm trying to find out where the water came from if it didn't come from above. Do you have any explanation of where this Star Point Sandstone came from?

A. Sorry. If I can elaborate, I was merely thinking in terms of the Star Point sandstone, and the lenses of the Star Point Sandstone, and how water moves through the Panther Tongue in the Star Point Sandstone versus water. Could have gotten to the Star Point Sandstone through the -- coming through the Black Hawk Formation, yes. That's most definitely probably how it got there.

Q. Okay. So these tongues that we have talked so

much about of shale, that are -- I don't know, the shale or the tongues, or it is sandstones of tongues, but we have these tongues of shale, I'll say shale. They're not blocking all the water from coming into the Star Point Sandstone Formation?

A. No, but in areas they probably do prevent it from moving vertically.

Q. And?

A. Just like Mr. White testified, that the tongues of the Mancos tongues interfingered in the Star Point Sandstone could be discontinuous in areas. So if your question is, in areas where those tongues don't exist, it would potentially not block water from moving into the Star Point Sandstone.

Q. Also if there were faults or fractures that went through the shales, the water could move through the faults?

A. That's correct.

Q. Okay. Now, based on the Tritium analysis you reviewed and my understanding -- let me strike that.

My understanding is your job at the Division is to take the data that comes to you from the applicant and determine whether it meets the standards as a regulatory agency of your Division to approve the application; isn't that basically your job?

A. That's correct.

Q. Anybody else that does this with you or do you, as far as water and hydrology, somebody else -- do you do this alone, or are there other people that oversee your work or how that is that organized?

A. It depends. Different times different people work on different projects. There is more than one hydrologist at the Division, and in this particular permit there was more than one hydrologist that worked on it.

Q. Who had final say on this permit?

A. In terms of the, what, the Tank Seam revision?

Q. Yes.

A. I did.

Q. Okay. So you reviewed the Tritium analysis that was submitted by the applicant?

A. Yes. I did.

Q. And based on the Tritium analysis you couldn't differentiate between the mine water and Birch Spring water?

A. In terms of the Tritium analysis I couldn't differentiate between what?

Q. The mine water and the Birch Spring water.

A. The mine water and the Birch Spring water? I don't know. Can you show me an exhibit? I'm not as

familiar with it.

Q. I can, yeah, just take a second. Go to 2-14.

A. What appendix, what exhibit?

Q. Exhibit C. Second paragraph, first full paragraph on that page.

A. You're asking me if I agree with that statement?

Q. Yes, that you can't -- no, I'm asking you whether you can differentiate between the Birch Spring and mine water based on the Tritium analysis?

A. According to this Tritium analysis, it says that the Birch Springs Tritium is 1.12, and that the North Mains and the Second East Bleeders are of the same order of magnitude, yes, I would agree with that.

Q. Okay. Then if you look at the Piper and Stiff diagrams that are in that same document, they indicate that the mine water and the Big Bear Spring water are similar in chemical composition.

A. If you could show me the Piper and Stiff diagrams.

Q. 2-22.

A. What is the question?

Q. Whether you were able to differentiate between the chemical composition of the Big Bear Spring water and the mine water from those diagrams?

A. So, are you talking about four and two, points four and two on that diagram?

Q. Well, the mine has a number of different points, but --

A. That diagram, there's Big Bear Springs and SBC Mine.

Q. Okay. Yeah, four and two.

A. They look similar.

Q. Okay.

A. Looks similar as far as I can tell. This does not have any particular data associated with it. It would be more appropriate to look at a table with the actual data milligrams per liter or whatever was used to formulate this table. These are just points.

Q. Okay. Would you agree that Big Bear and Birch Springs are outside of the permit area of Co-op?

A. I would.

Q. And would you agree that Big Bear and Birch Springs are in adjacent areas to the permit area?

A. Yes, that's correct.

Q. And would you agree that the Star Point Sandstone from which these Springs issue, is potentially impacted stratum below the coal seam?

A. I would agree.

Q. Okay. And Mr. Mitchell asked you about

baseline data that's part of your job is to make sure baseline data is properly collected; isn't that correct?

A. That's correct.

Q. And would you just describe what's meant by baseline data so we are on the same page of the book?

A. Baseline data is we have a list of, and it's not specific to the regulations, it's a -- it's a series of parameters that we put together based on what we think are all chemical constituents found in water, and that then those samples are collected from springs, or groundwater sources, wells, etcetera, from the areas adjacent to the mine. Or in many instances the mines were in place prior to the law being enacted, so actually data from in the mines for a two year period, on a quarterly basis, or more frequent if we desire.

Q. And is baseline data important to you in reaching your determinations about an application for a permit?

A. That's true.

Q. And I don't want -- I'm not trying to hold you to yes or no answers, so why don't you explain why it is important?

A. Because that's the information that we use to make our decision in terms of cumulative impact to the hydrologic balance.

Q. Does baseline data also include flow records as well?

A. Yes, it does.

Q. And I want to direct your attention to page 2-10 of the Probable Hydrologic Consequences.

MR. LAURISKI: Is this Exhibit C?

MR. SMITH: That is Exhibit C.

Q. Does that chart contain baseline data?

A. I'd have to -- I'd have to look and see exactly where these points came from. I'm just looking at a table, I'm not looking at what it references.

Q. Why don't you go ahead and do that.

A. The dates to me indicate baseline data, early enough in the mining process.

Q. And you note there's no data for Big Bear Spring and Birch Spring in that baseline data?

A. There's Big Bear, no measurement. For Birch Spring, no measurement. That's correct, that's prior to 1984.

Q. That's right, but that baseline data is to get the idea of what the baseline is before mining, isn't that correct?

A. That's correct.

Q. Does that seem important to you that this baseline data is missing?

A. Certainly.

Q. Couldn't this be considered a fatal defect in the application, not having this baseline data?

A. I don't know. I don't know what you want me to say in regards to that.

Q. Let me --

A. Your question is, a fatal defect in the permit application?

Q. Means --

A. In what permit application, the Tank Seam revision, the Bear Canyon mine plan, the Hiawatha Seam? Which are you talking about, Mr. Smith.

Q. Any or all of those?

A. No. My response is that I'm here addressing the Tank Seam revision, and this is not based on data for the Tank Seam revision.

Q. It's been admitted in to evidence on that point, and testified both by you and Mr. White that's baseline data.

A. I'm not sure that -- I didn't generate this table, I don't know where this information came from.

Q. Okay.

A. Why would the point even be put in there if there was no measurement?

Q. Well --

MR. LAURISKI: For clarity in my mind, I'm sorry Mr. Smith, are you saying, Mr. Munson, you didn't consider this table in determining the significant revision for the Tank Seam?

THE WITNESS: Mr. Lauriski, there's many tables in this report.

MR. LAURISKI: This table.

THE WITNESS: This particular table, I probably looked at this, but the fact whether this information -- I didn't actually -- maybe I should, as a point of clarification, I did not review the probable hydrologic consequences for the Blind Canyon Seam, Hugh Klein did that. I was only involved with the Tank Seam permit revision.

MR. LAURISKI: And my question is, did you consider this table in making your determination?

THE WITNESS: I did, and I don't know specifically -- I can't address, you know, what, in relationship, what this means because I'm not -- I'm not familiar. These are just two points in this table.

MR. LAURISKI: Let me ask you again. Did you consider this table?

THE WITNESS: Yes.

MR. LAURISKI: Yes, thank you.

BY MR. SMITH:

Q. I'd like to --

MS. LEVER: Mr. Smith, could I ask a question? Mr. Munson, I understand you're saying you didn't do the original permit for the Blind Canyon Seam. Had you been --

THE WITNESS: Can I clarify that a little bit?

MS. LEVER: Would that information have been important to the original review of the Blind Canyon Seam?

THE WITNESS: It certainly would have been. If I could clarify it. There has been 16 hydrologists that have worked at the Division since I've worked there. And on this particular permit, four of those people have worked on this over the course of this period of this mine being in, so different people have worked on the thing at different times.

MR. LAURISKI: However, Mr. Munson, you said you were the one that was responsible and primarily responsible for issuing a Tank Seam revision.

THE WITNESS: That's correct.

MR. LAURISKI: And you're on the stand.

THE WITNESS: That's correct.

MR. LAURISKI: That's why we're asking you the question.

THE WITNESS: That's correct.

MR. LAURISKI: Okay. Thank you.

BY MR. SMITH:

Q. I probably have an extra copy of these. I want to talk about some regulations, and I'm going to bring you a copy, and this is, for the record, this is the Utah Administrative Code, regulations that are found in part R 645-301-700, and starting with part 724. And ask you to direct your attention to that. Are you familiar with these regulations?

A. Yes, I am.

Q. And these are the regulations that govern your regulatory activity in issuing permits such as the permit we're here discussing today?

A. That's correct.

Q. Okay. I'd like to ask you to read under the heading baseline information. Just that, I guess one sentence, that's under baseline information, part 724 of the regulation.

A. Baseline information. The application will include the following baseline hydrologic, geologic and climatic information, and any additional information required by the Division.

Q. So is it your understanding that the information, baseline information is absolutely mandatory?

A. Yes.

Q. Okay. Why don't you read the next section 724.100.

A. Groundwater information. The whole thing?

Q. Yes.

A. Okay. The location and ownership for the permit and adjacent areas of existing wells, springs and other groundwater resources, seasonal quality and quantity of groundwater, and usage --

Q. Stop. That's one sentence I'll ask you a question about. Is my understanding correct that people have to identify locations of springs such as Big Bear and Birch Spring, when they submit an application for permit?

A. That's correct.

Q. Okay. Go ahead.

A. Water quality descriptions will include, at a minimum, total dissolved solids or specific conductance corrected to 25 degrees C, pH, total iron and total manganese. Groundwater quantity descriptions will include at a minimum, approximate rates of discharge or usage, and depth to the water in the coal seam, and each water bearing stratum above and potentially impacted stratum below the coal seam.

Q. Now, this is minimum information, is that

correct?

A. Correct.

Q. So at a minimum, it sounds -- my understanding of this is that it's required that the approximate discharge from these springs, Big Bear and Birch Spring, is required to baseline information?

A. Yes.

Q. Absolutely mandatory?

A. Yes.

Q. Can you show me where that information is? We just looked at the chart and it's not there.

A. This chart? Are you saying it doesn't exist?

Q. I'm saying it's not of record.

A. Okay. I don't, you know, looking at this chart it appears it doesn't exist at that point in time.

Q. If it doesn't exist, this application shouldn't go forward because it doesn't meet the regulatory requirements; isn't that correct?

A. It would appear so, at that point in time.

Q. Do you have any knowledge of what has caused decline in the Birch Spring and Bear Spring that we've been here discussing these two days of the hearing?

A. Other than the information presented, I don't have any other knowledge.

Q. Now, you have a right to require additional

information besides this minimum information in the regulations, isn't that right?

A. This is correct.

Q. And you can up your description as to what other studies or things may be helpful in determining what's needed before you can make your determination that there's no adverse affect outside of the permit area?

A. This is correct.

Q. And you did ask for some additional information, that's how we came up with the drill hole information, isn't that correct?

A. This is correct.

Q. That information, the drill hole information, that wasn't available, or was that available? I don't know, you tell me. Was that available at the last go around when the last permit was approved for the Co-op mine?

A. Yes. The last decision made about permitting at the Co-op Mine?

Q. Well, the permit before this.

A. The drill holes were drilled in what, 1991, I believe.

Q. I don't know. And I --

A. DH 1 and DH 2 were drilled in late '91, DH 3

was drilled in 1992.

Q. So, what I'm wondering is if this information -- this is the first time this has gone through a regulatory process and hearing, whether it went through on the time before?

A. No, this isn't the first time that this information has been presented at a hearing or been -- had been available at a hearing, that I'm aware of. Depending on what hearing you're talking about, the informal conference.

Q. I know there was an informal conference a year ago on this same issue that we're here for today. Is that what you are referring to that has been through a hearing before?

A. And then in terms of -- there was another decision made by Diane Nielson, I believe, prior to that.

Q. And was this information all available for that?

A. What was the date? Do you know the date of that? There's so many.

Q. I don't. I wish I did, I don't.

A. I believe it was -- I'm not.

Q. Because as I look at the dates on these documents, they're dated -- at least this information

was put together in April of '93, which would lead me to believe it was just done prior to the informal hearing with Mr. Carter, which this is an extension of.

A. I would have to ask, you know, this date here, whether that's the accurate date or when this data was first presented -- I'd have to ask Earth Fax or Co-op if they are privy to that date.

Q. I think it's --

MR. MITCHELL: So you don't know the answer?

THE WITNESS: I don't. I don't have the answer right in front of me on the dates. We could get that information.

MR. SMITH: Okay.

MS. ERLER: Mr. Smith, could I ask a question? Mr. Munson, could you -- as a point of clarification on the baseline data, is that data that's collected, is it the first data that's collected at any particular sample spot, or is it the first data that's collected at a period of time when you start looking at a particular situation?

THE WITNESS: The way baseline data is supposed to work, is it's supposed to be information collected prior to mining. But in many instances, we have had mines that have been in place prior to the law. So, we're just dealing with extensions of existing mine

operations. We initiate baseline data collection prior to the permit being approved, and there is no criteria in here in terms of length of time. But we have to have adequate data to determine seasonal, and variation on quantity and quality of groundwater and surface water, that would be for springs, that would be for mine water, that would be for, if the mine is existing, it would be for surface water, things of that nature.

MS. ERLER: So data collected before a certain period of time, but not necessarily within a certain window of time?

THE WITNESS: It's collected prior to a permit being issued. And it's kind of -- the way it's supposed to work is, ideally the mine was never there, the data was collected and assessment of that data was made and a decision was made that there was no impacts to the cumulative hydrological impact or cumulative hydrologic balance outside the permit area of what that proposed operation is based on the baseline data that's collected. It's kind of confusing. Maybe I'm not saying it correctly. But yes. Your question is, it's collected prior to mining occurring, prior to a permit being issued?

MS. ERLER: Is it --

MR. MITCHELL: She wants to know whether it's

collected.

THE WITNESS: Prior to a permit being issued?

MS. ERLER: Prior to a point in time or within a narrow window, all the data has to be collected within --

THE WITNESS: Generally a two year period. It could be as little as a year.

MS. ERLER: So there is a certain window when you look at this table, the dates certainly jump around more than a two year window, so would this necessarily qualify as baseline data?

THE WITNESS: Some would be considered operational data. Once you go in to grant a permit, the data collected becomes operational because you are no longer -- baseline data is considered data collected prior to a permit being issued. Although, in this particular situation, the data is -- much of it spans a great period of time, and certainly some of it is operational because the mine was permitted. I don't know when the Bear Canyon mine was originally permitted, but obviously it was prior to 1990, or 1991. This table isn't listed baseline data.

MS. ERLER: That's initial. Yeah. So, there's a distinction there.

THE WITNESS: I didn't generate this table.

MS. LEVER: I have a question. Mr. Munson, you're saying had you been doing the original, or a permit prior to -- well, when was the initial permit issued? Are we pre law?

MR. HANSEN: I believe it was issued in 1981, '82, in that area.

MS. LEVER: Is that pre law?

MR. LAURISKI: We need to focus on Mr. Munson, he said he didn't know when the initial permit was granted.

MR. MITCHELL: He's the only person on the stand under oath at the moment.

MR. LAURISKI: That's right.

MS. LEVER: Okay. Let me ask you the question. So table 2.5, if I understand your testimony, is information that would have been submitted at some earlier time, that was resubmitted as part of this revision; is that correct?

MR. MITCHELL: If you know, just answer the question.

THE WITNESS: I don't know.

MS. LEVER: But this was submitted with the revision?

THE WITNESS: Yes, it was part of the Bear Canyon mine.

MS. LEVER: Okay. Looking at the next page, 2-11.

Tell me how that relates to the prior page.

THE WITNESS: 1991, other spring and mine flows. It doesn't give any dates in terms of when the samples were collected, it's just an average of -- gives a number of samples. I imagine that's the samples that they used to calculate the flow information, and average flow value for those springs of mine water flow rates.

MS. LEVER: This would have also been in the information you reviewed in 1993?

THE WITNESS: Yes.

MS. LEVER: So would you have had information now, measured information about the sources of water that you were concerned about?

THE WITNESS: Oh, yes.

MS. LEVER: So they in fact existed at the time when you considered your revision?

THE WITNESS: Yes. We had data prior to.

MR. LAURISKI: Okay.

MS. LEVER: Thank you.

MR. LAURISKI: Sorry, Mr. Smith, go right ahead.

MR. SMITH: That's fine.

Q. It's the applicant's responsibility to get the information to the Division, isn't that correct?

A. Yes, that's correct.

Q. And if there's a defect in the information

that's, or a lack of information, it's up to the applicant to provide that, isn't that correct?

A. That's correct.

Q. And the information regarding hydrology, that would be found in the probable hydrologic consequences?

A. This is correct.

Q. So we have the right document in front of us I take it?

A. This is correct.

Q. I don't have any further questions.

MR. LAURISKI: Mr. Appel?

BY MR. APPEL:

Q. Mr. Munson, are you aware of any surveys that have been done for the Townshead (sic) Big Eared bat habitat adjacent to the workings of the Tank Seam?

A. I've heard of surveys, I'm not familiar with them. I didn't carry them out.

Q. Do you know if they have been carried out?

A. I think so, I don't know. I wouldn't say --

MR. MITCHELL: So you don't know is the answer?

THE WITNESS: I don't know.

BY MR. APPEL:

Q. You do know that survey was required pursuant to the technical analysis for this project?

A. I don't know.

Q. Okay. We heard some testimony earlier from Mr. Reynolds that the eight foot bore hole that been completed, maybe this is some confusion of my own, but under whose authority did they complete that bore hole?

A. Under the Division's authority, I believe.

Q. Why would they complete that bore hole before they have permission to mine the Tank Seam?

MR. HANSEN: Objection, they do have permission.

THE WITNESS: They do have permission.

MR. LAURISKI: That's not an objection, he could have answered the question.

MR. HANSEN: States facts not in evidence.

MR. LAURISKI: Those are facts in evidence. You brought on Mr. Reynolds, and you asked Mr. Reynolds about the completion of that bore hole. I think the question is appropriate at this point.

MR. HANSEN: The fact assumes there is no permission given, that's the fact that is not in evidence.

MR. APPEL: I'm trying to find out if there is.

MR. LAURISKI: Let's move on.

BY MR. APPEL:

Q. So it's under the Division's authority that bore hole was completed?

A. Yes.

Q. What's the purpose of that bore hole?

A. To mine the Tank Seam.

Q. But isn't the approval of the Division in this hearing a necessary pre-condition to Co-op mining from the Tank Seam, and in using that bore hole?

A. Could you phrase that question again, I think the answer is yes.

Q. Isn't it --

A. The Division has to give approval to mine, for the bore hole to be constructed?

Q. Yes.

A. Yes.

Q. Isn't it premature to allow them to proceed with that bore hole?

MR. MITCHELL: To the extent you are asking him for a legal conclusion as to the rights of Co-op concerning mining, when he is here as a hydrologist, that's beyond the scope of his -- he's not qualified to answer that question.

MR. LAURISKI: Let me ask the question then so perhaps we can move on. Is the drilling of a bore hole considered exploration or considered mining?

THE WITNESS: Well --

MR. MITCHELL: He's not qualified to answer that question either.

MR. LAURISKI: He can tell it and that's fine.

BY MR. APPEL:

Q. The reason, for the benefit of the Board, I'm asking these questions, is that it doesn't appear the Division -- we're going to argue the Division doesn't have very good control over the entire mining operation, and we wonder how it is they could be allowed to drill a bore hole when they don't have approval to mine a certain seam yet.

MR. LAURISKI: I don't think you can say that, Mr. Appel.

MR. MITCHELL: Nothing has been established. He said he's not qualified to tell you.

MR. APPEL: You said he wasn't qualified.

MR. LAURISKI: No, let's stop.

MR. APPEL: Let's move on. That's a bigger problem anyway.

Q. You've been here for the entire two hearings, right, Mr. Munson?

A. Yes.

Q. Did you agree with my interpretation that really we have two separate theories grounded in essentially the same facts, and I'll explain them. One being that the mining is encountering perched aquifers, and the second being that it's encountering the regional aquifer's leading edge of the potentiometric surface?

A. I do.

Q. Okay. So that's really what we come down to, that's where people part company in this?

A. I guess that's one fact, that's just one fact of many pieces of the puzzle.

Q. And you're in the camp that states we're encountering perched aquifers?

A. I believe that's true, yes.

Q. Okay.

A. I don't know if you'd say camp, but --

Q. You agree with that theory?

A. I agree with that theory.

Q. Okay. And that's the theory enunciated by Co-op, correct?

A. That's one piece of the puzzle.

Q. Okay. When a perched aquifer is encountered, it's usually encountered through the roof of the mine, correct?

A. That's true.

Q. How do you reconcile the perched aquifer theory with the statement in the technical report? This is the July 20th, 1994, report, Exhibit B.

MR. LAURISKI: I'm sorry, Exhibit B?

MR. APPEL: B. It's the third page in under baseline data for cumulative hydrologic impact

assessment. And I'll read you the beginning of the second full paragraph of that page. Big Bear Springs and Birch Springs in the vicinity of the Bear Canyon mine, issue from joints at the contact between the Panther Tongue and the Mancos Shale. The majority of the water inflows in the mine are through bolt holes and fractures draining perched aquifers in the Black Hawk, and an indeterminate amount of interception of water from the floor. The area of the second east entrance.

How do you reconcile this water bubbling up through the floor with the perched aquifer theory?

A. You asked me a question whether I agreed with it, perched aquifers were supplying water. Your theory. You didn't ask me the question whether I believed water was coming through the floor of the mine.

Q. Well, I'm asking you to --

A. You didn't ask me for my theory, you asked me if I agreed with one theory or the other.

Q. Well, I realize this is risky business, but is your theory different from Co-op's?

A. My theory is also -- I'm not sure my theory is different from Co-op's. But my theory may be different from Rich White's.

Q. Okay. Let's enter the realm of risk. What is

your theory?

A. My theory is what you just read.

Q. That's the statement of fact, that's not a theory about where this water is coming from. What is your theory?

A. The water is coming from perched aquifers in the Black Hawk Formation, as well as coming up through the floor in the mine, in the north part of the Bear Canyon mine.

Q. Isn't it just as likely that the reason that water is bubbling up from the floor is you've encountered the leading edge of the potentiometric surface?

A. This is correct.

Q. What sort of work -- I'll back up. As part of the mitigation responsibilities of Co-op, aren't they required to identify replacement sources should they contaminate the sources, for instance, in this case Birch Springs and Bear Canyon Springs?

A. That's true.

Q. What replacement sources has Co-op identified?

A. Actually, I would like to clarify my response. It's not a regulatory requirement that they replace water. It has been, as far as I understand, that law has still remanded -- is not part of the Utah Rules and

Regulations.

Q. Do you believe that that's only contained in the Energy Policy Act of 1992?

A. I don't know. I'm not qualified to answer that question.

Q. Well, it's fairly important, since you've dealt with this permit. Did Co-op identify any replacement water sources?

A. Yes, they did.

Q. What were those sources?

A. They have in excess of 15 acre feet of water available to them, rights in the Huntington/Cleveland Irrigation, I think. 15.5, in excess of 15 feet, acre feet of water.

Q. But aren't those sources Birch Spring and Big Bear Spring?

A. In terms of replacement water, its shares of water. Where it comes from, I'm not privy to.

Q. But assuming there can be a quantity or quality problem or both, with either of these springs, what are these people going to drink down there?

A. I have no idea.

Q. And Co-op hasn't given you that answer either, have they?

A. They have said they have adequate shares of

replacement water.

Q. But --

A. In terms of my assessment, that's all I needed to know. There is -- I'm not, like I said, I'm not qualified to answer his question.

MR. MITCHELL: Then don't.

THE WITNESS: Then I won't.

BY MR. APPEL:

Q. But if the source of those waters you mentioned, Huntington/Cleveland are either downstream or the same as Birch Spring and Bear Spring, and Birch and Bear are somehow rendered unusable or insufficient, where is this water going to come from?

MR. MITCHELL: Are you referring to a particular part of the findings document, or was this just a general abstract question?

MR. APPEL: It's a general question with respect to --

THE WITNESS: I don't know the specific source.

MR. MITCHELL: Are you asking him to point to a place in his document where he's addressed this issue?

MR. APPEL: He's been through the document, I haven't, in my meanderings through it, I haven't seen any replacement sources that meet the law. I'm asking if he --

MR. MITCHELL: Let me be clear. He's asking you have you addressed water replacement in your report, yes or no?

MR. APPEL: That's not what I asked.

MR. MITCHELL: Bite size piece first.

MR. LAURISKI: I think he's answered the question, Mr. Appel. He said that they identified that they had in excess of 15 acre feet of replacement water. He testified he doesn't know the source of that water.

(Whereupon a recess was taken.)

MR. LAURISKI: Okay. Let's go back on the record.

MR. LAURISKI: With that, Mr. Appel, we'll go back on the record and continue your cross-examination of Mr. Munson.

BY MR. APPEL:

Q. Mr. Munson, this may be somewhat beyond you, you know, or your counsel will tell me if it is. As part of your review of the probable hydrologic consequences, CHIA, do you have an obligation to determine what will happen to water resources with respect to quantity and quality after the mine has been closed?

A. Yes.

Q. Did that occur in the course of these documents that have been presented?

A. In relationship to the impacts from the mine on that, yes.

Q. How is Co-op going to protect the quantity and quality of these sources after the mine closes?

A. How? Specifically?

Q. Yes.

A. We haven't made a determination they are going to impact them.

Q. When will you make that determination?

A. We already did. We made a determination that they were not going to impact the water sources, therefore protection is, to say, synonymous with protection in my view.

Q. Okay. How long have you been working on the Co-op mine?

A. One continuous, adding up all the blocks of time that I have or have not?

Q. No, how many years have you been?

A. At the Division and familiar with the Bear Canyon mine?

Q. That's a good question.

A. I started with the Division in 1982. I believe I've been familiar with it for 12 years.

Q. Have you had any problems with compliance with them in the past?

A. In relationship to what?

Q. Anything.

A. Me, personally?

Q. The Division.

MR. MITCHELL: If you know the answer.

THE WITNESS: Yes.

BY MR. APPEL:

Q. Any significant problems with compliance in comparison to other coal mines in the area?

A. I couldn't answer that question.

Q. How many violations have they had roughly?

MR. HANSEN: Objection, grounds of relevance.

MR. LAURISKI: Tend to agree Mr. Appel, I'm not sure the point of past history or what the history has to do with respect to whether or not this revision is appropriate.

MR. APPEL: Well, if you'd like me to argue it, I can briefly. It goes along with Mr. Smith's suggestion, you look at a larger ballgame here, and their past track record with respect to compliance with Division requirements certainly is important. When you have the lives and livelihoods of people at stake, it's not gonna take too many mistakes to affect these people. So if there's a clean mine, it helps them. If it's one that's less than that or there's problems, I think it's

important for that to weigh into the Board's purview.

MR. LAURISKI: We're talking about violations on the surface versus underground to begin with. If you're wanting to limit that question to any issues relative to the water, hydrologic balance, I think it would be appropriate. But if we're talking about whether or not they were in violation for not having a top soil pile identified or something like that, I don't consider that to be relevant to this issue.

MR. HANSEN: I also object, this is far exceeding the scope of direct.

MR. APPEL: I think it's already in evidence, I'll withdraw that particular question.

MR. LAURISKI: Thank you.

MR. APPEL: Take me a moment. Could I direct your attention quickly to page 4, table 4.1 in Exhibit C, Mr. Munson. It's entitled the Summary of Potential Impacts and Mitigations.

A. What's the page?

Q. 4-2. Appendix 7 J. Tell me if you can't find it.

A. I found it.

Q. What does it take to become a mitigation measure for the purposes of this table?

A. This is what Earth Fax put together as a

table. This wasn't based on any criteria the Division has per se, other than they presented mitigation measures of their choosing.

Q. Let me direct you to, on that page, groundwater availability, three statements.

A. That's correct.

Q. The mitigation measures monitoring. Is monitoring really a form of mitigation?

A. No, not necessarily. No.

Q. What it would do is provide a signal that mitigation is necessary, correct?

A. That's correct.

Q. So really they haven't answered the question there as to whether or not what mitigation measures would be undertaken as far as availability of groundwater; is that correct?

A. That's correct.

Q. Okay. I don't have any further questions.

MR. LAURISKI: Thank you. Mr. Mitchell?

MR. MITCHELL: No further questions of this witness.

MR. LAURISKI: Mr. Hansen?

MR. HANSEN: No further questions.

MR. SMITH: No.

MR. LAURISKI: Thank you, Mr. Munson. Anything from the Board? Thank you, Mr. Munson.

THE WITNESS: Thank you.

MR. MITCHELL: I'd like to call Daron Haddock.

DARON HADDOCK

was duly sworn, was examined and testified as follows:

BY MR. MITCHELL:

Q. Mr. Haddock, would you say your full name and spell it for the court reporter.

A. Daron Richard Haddock. D-a-r-o-n, R-i-c-h-a-r-d, H-a-d-d-o-c-k.

Q. And what is your position with the Division of Oil, Gas and Mining?

A. I'm a permit supervisor.

Q. Are you essentially Tom Munson's supervisor?

A. For that project, yes.

Q. With regard to the Exhibit A, introduced by Co-op, is that your signature at the bottom?

A. Yes, that is.

Q. And it was you who made the determinations in 1 through 12, as well as any special conditions; is that correct?

MR. LAURISKI: Could you speak up.

BY MR. MITCHELL:

Q. It was you who made the determinations with regard to the listed items 1 through 12; is that

correct?

A. Yes.

Q. As well as the special conditions 1, 2 and 3?

A. Yes.

Q. With regard to the materials submitted to the Division for the Tank Seam revision, was that material designed to address only those portions of the plan that would be effected by the revision?

A. I'm not sure I understand.

Q. Is it a completely new application for a permit, or is it an application to revise a permit?

A. It is an application to revise.

Q. Do you judge it on the basis it's sufficient for a completely new permit, or base it on the position it is sufficient --

A. Sufficient to support the revision. We would not go back and necessarily review the entire plan. It would be -- basically we would build on the existing plan, and determine whether or not to approve the plan based on them supplying the necessary information to satisfy the findings that we have to make.

Q. And with regard to the findings for revision, are there requirements for baseline data for the entire permit to be resubmitted, reconstituted, or is the original baseline data that's supporting the permit

sufficient to be simply augmented with regard to any revision?

A. Generally in this case we would only look for augmenting the original information. We would not require them to go back and collect all the baseline data that was in the original permit. It would be information relevant to the new permitting action, and that would be augmented to what was already in existence.

Q. As of today, does Co-op mining have an approved revision to allow them to begin mining the Tank Seam?

A. Yes.

Q. Has the Division, to your knowledge, been served with anything which would stop them from having granted that authority?

A. Not that I'm aware of.

MR. MITCHELL: No further questions.

MR. LAURISKI: Mr. Hansen?

BY MR. HANSEN:

Q. Are you familiar with the permit?

A. Yes.

Q. Does the permit itself have baseline data for Big Bear and Birch Springs?

A. Yes.

MR. MITCHELL: Only if you've looked at it and can

answer that question with actual knowledge sitting here today.

THE WITNESS: Yes.

MR. HANSEN: No further questions.

MR. LAURISKI: Mr. Smith?

BY MR. SMITH:

Q. Mr. Haddock, look at Exhibit C, please. Is this a completely new hydrologic consequence that you prepared simply for this revision, or is this a revision of the prior PHC that was prepared?

A. I would probably need more time to evaluate that, you know. Just a second.

MR. MITCHELL: Have you actually read that document before, Daron?

THE WITNESS: Parts of it, and I'm not completely familiar with it, no.

MR. APPEL: Mr. Mitchell -- if he wants to interpose an objection, I think that's proper, but this continual coaching of the witness is highly improper.

MR. LAURISKI: I agree.

MR. MITCHELL: Okay. I object, he hasn't established he's ever looked at the document, or is familiar with it.

MR. APPEL: Are you objecting on the grounds of foundation then?

MR. MITCHELL: Foundation.

MR. APPEL: Okay.

MR. LAURISKI: Well, whose question are you objecting to? The question with respect to baseline data was opened by Mr. Hansen.

MR. MITCHELL: Now the question is, what's in this particular document, and I'm saying objection, there's no established -- it hasn't been established he's ever looked at it.

MR. LAURISKI: He just said that he was familiar with the permit application.

MR. APPEL: And he signed his name which appears at the top of it.

MR. LAURISKI: And I think the question is appropriate. We've only had one basic question, two questions with respect to the permit application that he signed, Exhibit A, and that he's familiar with baseline data. So that's where we're gonna hold the line on cross-examination.

MR. MITCHELL: Let's determine if there's a question pending still.

MR. LAURISKI: Mr. Smith, would you reask your question.

BY MR. SMITH:

Q. My question is, is this the same probable

hydrologic consequence that was used to get the permit originally, that has just been modified for the substantial revision, or is this an entirely different document than the PHC?

A. I don't know. That I don't know.

Q. Does it contain information that's -- for example, does it contain information -- is this solely directed towards the -- is everything in here solely directed towards and only relevant to the revision that's sought by Co-op?

MR. MITCHELL: Answer yes or no.

THE WITNESS: Okay.

MR. MITCHELL: Or I don't know.

MR. LAURISKI: Mr. Mitchell.

MR. MITCHELL: Sorry.

MR. LAURISKI: You know, your witnesses need to be prepared ahead of time in terms of how they answer, and let him answer the question so we can move on because all it's going to do is create more objections and we need to move on.

THE WITNESS: I don't believe the question is one that I can answer the way it's stated. Okay? I guess I cannot answer the question the way it's stated. Perhaps restating it would help.

BY MR. SMITH:

Q. Let me try. Is all this data in Exhibit C, is this all directed solely towards the revision or does it contain data for the previous permit?

A. Okay. I think I understand. This contains, this information was submitted I believe for the significant revision.

Q. So, all of the things that are in here would be relevant to the issuance of the approval of the significant revision?

MR. HANSEN: Objection, calls for speculation.

MR. LAURISKI: Objection overruled. You can answer the question, Mr. Haddock.

THE WITNESS: I would say this is relevant to the approval of the Tank Seam revision, yes.

Q. Okay. And so the information in here that discusses dewatering in the Blind Canyon Seam, that was relevant towards the determination to grant the significant revision of the Tank Canyon Seam?

A. I would not say that.

Q. Well, what is it relevant to?

A. I'm not sure. What was your question again?

Q. I'll withdraw that question.

What is the purpose of the document that's Exhibit C, Probable Hydrologic Consequences?

A. That is a document that was submitted by the

applicant which discusses what the -- essentially what the probable hydrologic consequences of their application is going to be, what consequences their operations would have on the hydrologic balances of the area.

Q. And to do that, would you need to have baseline data in this document to determine -- would that be considered a necessary part of the PHC?

A. I think baseline data is a necessary part of any application.

Q. Can you direct me to the baseline data in this Exhibit C?

A. No.

Q. Regarding only the flows from Birch Spring and Bear Canyon Spring?

A. I don't believe I'm qualified to do that.

Q. Well, before, you testified that there could be a limitation on the baseline data in this document; didn't you testify to that effect?

A. I don't recall saying that.

Q. So, you're not qualified to say what should be in this document?

A. I believe I know what should be in this. What I'm saying is, I don't -- I have to rely on other people to review this, and so, you know, I'm not completely

aware of where everything is located in this. And I believe that was your question.

Q. And you can't direct me to where the baseline data is regarding the flows of Birch and Big Bear Springs in this document?

A. No.

Q. Is it your understanding that those -- that information needs to be in this document?

MR. LAURISKI: Mr. Smith, I think he already said yes, it was his understanding.

MR. SMITH: I don't have any other questions.

BY MR. APPEL:

Q. Is it safe to say, Mr. Haddock, that you relied upon Mr. Munson's recommendation before you signed this particular document?

A. Yes, it is.

Q. So you didn't read it in depth?

A. That's correct.

Q. Okay. Thank you. That's all I have.

MR. LAURISKI: Thank you. Anything further?

MR. MITCHELL: Nothing.

MR. LAURISKI: Mr. Hansen?

MR. HANSEN: No.

MR. LAURISKI: Thank you, Mr. Haddock.

MR. LAURISKI: Mr. Mitchell, anything further?

MR. MITCHELL: No.

MR. HANSEN: Mr. Chairman, petitioners have tried to set up a straw man for purposes of knocking it down. I would like to call Charles Reynolds as rebuttal.

MR. SMITH: We object to that Chairman, we have called our witnesses, called no rebuttal witnesses. The only proper witnesses they could call would be surrebuttal to our rebuttal. If they wanted to call Mr. Reynolds -- I'm sorry, Mr. Chairman.

MR. LAURISKI: Thank you.

MR. SMITH: I think they've had two bites of the apple, and a third bite, especially at this late hour. It's not called for and highly improper and we strenuously object to that.

MR. HANSEN: Petitioners have made a lot of noise about where in the application is this baseline data, and that's the only issue I want to get into. It was something that they got into and exceeded the scope of direct examination, and I think it's fair to have, and point out to the Board where that information is. Like I say, it will only take two minutes.

MR. APPEL: But the response may take quite a bit longer if he has Mr. Reynolds justifying the baseline data in these documents.

MR. HANSEN: I have no strong feeling on it either

way. Mr. Haddock testified the information was in the application, and he just wasn't able to testify where it would be, if it was in Exhibit C. The evidence is in and it's in the application.

MR. LAURISKI: You have had two opportunities to put Mr. Reynolds on the stand. You have an opportunity in your closing arguments as well as in your post hearing memorandum, to clarify or point out any issues that are necessary along that line, so I'll not allow Mr. Reynolds to come back.

MR. HANSEN: I understand.

MR. LAURISKI: As rebuttal.

Okay. Again, with that, hopefully we can move to closing arguments. Given the fact we're going to allow you to file post hearing memoranda, I expect these arguments to be brief and to the point and without interruption. Thank you.

Mr. Hansen?

MR. HANSEN: In light of the fact we will be filing written arguments, my closing argument here will be very short. We need to focus on the narrow issue and we have heard the petitioners, I think, bleed all over the record and go very far afield of what the issue really is. Regulation R645-300-133.400, requires the Division to determine that the proposed operation has been

designed to prevent material damage to the hydrological balance outside the permit area. And the Division has made that determination. And the only real issue is whether that determination is supported by the facts, and in particular, the issue is whether allowing Co-op to mine the Tank Seam, will cause material damage to Birch and Big Bear Springs. That's the issue.

The issue is not what happened three years ago in Big Bear, or in the other mining operation. There will be no material damage as the Division has already found, because first, there is no water at the Tank Seam, there is no water above the Tank Seam, there is no water below it.

Second. There is no significant risk of contamination. Whatever contamination might conceivably arise, and petitioners have identified no source of contamination, would likely be no different from what any other risk might already exist in the present mining activities, and that's already been resolved in favor of Co-op Mine. That type of contamination does not pose a significant risk. The only possible sources of contamination are from typical mining activities that arise in any mining activity. If that was a concern, every mine in the state would have to be shut down.

Third. The uncontroverted evidence establishes that

Big Bear Spring is hydrologically isolated from the permit area, and it also establishes that the Birch Spring is hydrologically isolated from the permit area. There is a great deal of testimony to the contrary primarily from Mr. Montgomery. I'm not going to go into any details there, but I'll demonstrate through my written argument that his testimony is inconsistent, and does not support the conclusions that he would like the Board to come to. And I'll leave it at that.

MR. LAURISKI: Thank you.

MR. MITCHELL: I'll reserve it for writing.

MR. LAURISKI: Thank you, Mr. Mitchell.

MR. SMITH: Well, I never reserve anything to writing when I can say it. So, I first want to tell the Board that I've appreciated your patience. I bet if you thought you were gonna sign on for hearings like these, you would have thought twice before you signed on to the Board. And it's been a long day and-a-half for the Board, and you've been extremely courteous to us, and we understand that we're, you know, coming here with a difficult issue. And it's difficult for us and we think it's difficult to everyone because it's such a critical issue. Safe drinking water and having drinking water is second only to air, and having air to breathe is important to the people.

And I think you had a chance the first day to see our clients who were here representing, and trying to do a good job representing. You see these are modest companies that serve modest folks in an area of the state that is, you know, where you work for a living. And we understand that Co-op Mine folks do the same. And we understand we have a difficult issue.

We also understand the very great importance of this Board. First, we have -- there's a wisdom of how our state is set up by the regulatory system for mines. There's kind of a double fail safe; the first front line is the protecting of the public and the public's water and the drinking water, is the Division itself. And that we think they do a good job, and unfortunately we think in this instance, maybe not as good a job as they needed to do.

And I think there was a recognition that there wouldn't always be, just like anything else, the Division isn't perfect just like anything else. There may be instances where something else needed to happen or some -- a second look, and that's where this Board is. This Board is the expert citizen Board, however you want to put it, that is here to review, carefully review, we hope, the things the Division does because the public is depending on this Board to do that review,

and this is your function here today.

Really a single question faces this Board, but it's an important question and it's complex and it has -- it's not just simply answered. But the single question is should the Division have issued the significant revision of Co-op's permit. That's the question this Board has to determine. Now, in determining this question, the Board has several things to help it in making this determination. I'd like to just take a few minutes and point those out, and I'll be brief as everyone wants to be.

The first question is, did the applicant demonstrate the compliance with the state program, or with the regulations. And that's -- it's the applicant's burden to have done that. And so when we look at the kind of things that lawyers like to talk about, burden of proof or who has to show what, it's not on us to show that they did something wrong, or the Division something wrong. The question you have to look at, and look at as anew, is did the applicant demonstrate compliance with the program. Did he show, did the applicant, did Co-op show that they have complied with the program which includes a showing that there has been no material damage to water outside of the permit area.

It's unquestioned that the water we're talking about

in these two springs are outside the permit area. They're adjacent to the permit area, that's was the uncontroverted testimony. And the question is whether they're being -- there's any kind of material damage to this water, quantity or quality.

Now, part of my closing argument I gave earlier when we talked about what is the purview of this Board or how broad is your scope of review. And I think that can only be answered through the regulations that govern these kinds of hearings, and the regulation that is on point is R645-300-200. Under 211 it talks about the scope of review, and this is the only place that it does talk about the scope of review. And it says, that has the time period, which we met, and there's no question about. But, a permit for coal mining reclamation operations, a permit change, permit renew or transfer or assignment or sale of permit rights, the applicant, permittee or any person with an interest which is, or may be adversely affected, may request a hearing. That's the only place it talks about the scope of review. There's nowhere where it narrows it to only certain segments of what that permit will do. What this permit's going to allow is Co-op to continue to mine in this area. Continue to mine the same mine through the same workings. That continues to dewater as it's

dewatering right now. And that's what -- it's like the blind men and the elephant, if you try to segment this the way Co-op is asking.

We heard that nursery rhyme or whatever you want to call it. You know, there were 12 blind men and an elephant, and the first one grabbed the tail and said, ah, elephants are like ropes. Another one grabbed his trunk and said no, elephants are like snakes. Another one grabbed the elephant's leg and said no, elephants are like trees. Another one grabbed the side and said no, elephants are like walls.

Well, none of those are very accurate because they were so limited in their scope. And the regulations don't rely -- don't allow that. Co-op has argued for that, and I think argued pretty persuasively. Argued persuasively enough that during the break, you know, I went during the days intervening these two hearings, I looked very carefully through the regulations and just found the regulations don't support that.

We have an important interest, and we are being adversely impacted by what's happening here, and that's all that's got to be determined. Once that determination is made that there is an adverse impact, the Board has power to do what it needs to do to send this permit back to the Division Board to be redone.

And then the next question is does the permit meet the requirements of the regulations. And as I said, the burden rests on the applicant to demonstrate compliance with the regulations. The conclusion that the division has to make, the standard -- if we go to the conclusion first then I'll step back from it a little bit, the Division has to make an assessment of the probable hydrologic consequences that no material damage to the hydrologic balance outside the permit area has occurred or will occur. That means no diminution of Big Bear or Birch Springs, no water quality. And he burden's on them to show that's not going to happen and that's not happening. The burden is not on us to prove that it has happened or will happen. The burden is on the applicant to convince the Board, and that's the determination, they have to show that.

Now, to reach this conclusion, the regulations require certain information be submitted to the Division. That's in the PHC. And that's -- and we focus on the hydrology, and that's R645-301-700. We'll cite these things in the memorandum.

Then we get to the baseline information. Baseline information is absolutely required. There's nowhere in the regulations that says you can skip some of the baseline information. The baseline information is the

base, I guess, of what's used to determine whether there's been an impact. Something slipped through the cracks on this. The baseline information just isn't there. This is a critical issue of critical importance, and this is one reason, and reason enough alone, why this should be sent back to the Division to gather that information and have that available.

A lot of the other information is left up to the discretion of the Division staff and their expertise, but this baseline information, as we went through very carefully with Mr. Munson's testimony, has got to be there, has got to there be to say what waters issuing from those streams. That has got -- that information has got to be there. It's not here. They try to make excuses for why it's not there. Those excuses don't hold, so to speak, any water.

But, this is not the only reason why this permit should be reversed and sent back to the division for further work. It's interesting, there's a standard here about the additional information and the language, the very strong language that's in the regulations. If you go to R645-301-700, it says the Division has the right to request additional information to, and this is an important word, insure compliance with the requirement of no material damage to the hydrologic balance outside

the permit area. I think this term insure is used advisedly and it's important. Have the actions of the applicant and the Division insure it will have no material damage outside the permit area. We have tried to seek explanations of why, in the last few years, our water has diminished, why the springs have quit issuing like they had for, as we put on, for years and years and years prior to this recent mining by Co-op.

We put on our expert who said the reason was, interference with the mining. The best we could get from either the Division or from the applicant, was well, we think it's related to precipitation.

There's been a lot of droughts over the years. Everybody that's lived in this state knows we have droughts like everybody else. But this water's not there. We have had no real explanation for the diminution of flow of Birch and Bear Springs. And I think a very dearth of information about those springs. The applicant wanted to look just at what was in the permit area. They looked very, only if they had to, little outside of it. For example, some very basic questions were asked about the springs they couldn't get any answers to.

One is, we all know these two springs issue from faults. That was in the reports. Everybody agreed to

that. We asked both of the applicant's experts, well, how big are those faults, where do those faults extend to? The answer was, we don't know. They couldn't even answer the basic questions about these springs, because they weren't focused on the springs, they were focused on ways to try to eliminate the mine impact on these springs. They should have been looking at the whole area and trying to figure out what was going on. That wasn't the approach. If one test would apparently knock out one, they would cite that even though it included the other one.

The Tritium tests show Birch Springs was the same age of water. We talked about the event where there was a mysterious increased flow in the springs and in the mine at the same time. No explanation for that. They just shrugged their shoulders and said they didn't know why that was.

Has the Division insured it will have no material damage to the flows of quality and the quantity -- quality and quality of Birch Springs? I think there's only one answer and that answer is no. It's extremely disturbing and I think important. This is such a critical question. And it's disturbing that there may be even somewhat of a lack of, I hate to use the term cavalier, but lack of sensitivity about the critical

nature of this water. We now this is probably the first time there's ever been this kind of a hearing. We know we're the first people bringing these kinds of complaints. But, it's -- these are critical things. When we brought up the 1992 amendment, Mr. Appel brought those up, we're saying those may not even be part of the Utah program. Let me just read and in closing what the 1992 amendment says. It requires an underground mine to promptly replace any drinking, domestic or residential water supply from a well or spring, in existence prior to the application for a surface coal mining and reclamation permit which has been affected by contamination, diminution or interruption resulting from underground coal mining operations. There's even a question of whether that's even being enforced by the Division. That's a federal law that's been in existence since 1992, t's not a brand new law. I say if it's not part of the Utah program, the Board should demand to become part of that program because that's the law this Board and this Division is supposed to be upholding as the SMAKRA laws, and we ask this Board do that, and put the protections in place which there are none now, to replace this water. Thank you, Mr. Chairman.

MR. LAURISKI: Mr. Appel?

MR. APPEL: Mr. Smith has covered this quite well.

I think in summary, for our position, Co-op only wants you, and I think the Division unfortunately as fallen pray to this, in order to prevail before you they have to ask you to look at a very small piece of a very large and complex puzzle. This is a mining operation. What they'd like you to do is forget, as Mr. Hanson said, what happened three years ago, forget what impacts that had, and ignore any cumulative impacts that new mining may have. At some point we have got to be able to look at the entire mining operation, and see what impact it's having on these precious irreplaceable water sources down there. Forget what everyone else said. I don't think that there are any replacement water sources. We have had testimony from our people that if they were there, they would be using them. These are absolutely critical water sources to the people that we represent before you.

It's unfair for a mining operation to attempt in any way to shift the costs to us, to my clients, of their operation. If they're in conflict, we have to sort that conflict out. But the statute, the existing legislation as well as the 1992, Energy Policy Act and amendments to SMAKRA, indicate who wins in the event of that sort of conflict. These are people -- when I first appeared before you in my introductory remarks, I made a point

that it's not endangered species, it's people. That's before I found out about the Townshead Big Eared Bat. We haven't had an answer to that one. I'm saying it partly humorously, but there is an endangered species problem connected, and I didn't hear an answer to that.

What I'm saying is that I don't think that an adequate job has been done in equipping this Board to make -- to see a fair picture and to make the decision you can. At a minimum it needs to go back for further study. We need to discuss and find the answers to where the source, what the original source was, and historic flow patterns were of water, prior to mining. What's going to be the effect of the connections of these mines with one another. I thought it was fairly interesting when we got to the -- unveiled the fact that the water was coming from the Blind Canyon Seam workings, which is water that has been tributary to water sources, is going to be pumped up to the Tank Seam. It's then going to -- and they said that's okay, because it's all going to be absorbed in to the coal, and it won't dribble down with all of its contaminants. Well, on the day they put 100 GPM up there instead of 10 or 15 or 20, it will. And certainly some conditions seem to be in place there. But what are they really saying? We won't contaminate you because the water is leaving the mine? That's

another interruption with the historic flow pattern. Not only do they take it from the mine straight out the portal instead of down gradient to the Birch Springs and the Big Bear Spring, but they're gonna pump it back up to the Tank Seam. But don't worry, that's all going out of the mine. That's how we first got here in the first place. All the water's going out of the mine and it's not getting to our springs.

These sorts of questions have to be answered and they have to be answered with specificity. And we're not gonna answer these questions with three drill holes the way they have been done in the past. Certainly we need more drill holes to answer these questions.

We have admissions about the geology of this area that these Mancos, the very critically important Mancos Shale tongues, not the main member, but the tongues within the sandstone, are in some areas thin, some areas thick, in some areas nonexistent. And they're basing their statement that they are blocking water on three drill holes. One foot away from that drill hole it could begin to thin. Theoretically they don't know the answers. They are critically important.

I also think it's sort of odd, if these are layers under hot intense, or relatively intense hydrologic head that we're not seeing springs until the contact with the

Mancos Shale which is where we have seen Birch and Bear, which is where we've always seen Birch and Bear, that's historic. It just doesn't track. Now the way to get a fair presentation is to ask for more data. Ask for better studies. It's a very very important determination that has to be made.

I don't think that you're equipped. We have shown that at a minimum you need more. What we have asked for is that this be denied at this point in time. Our basic problem is we're getting beat to death with pay no attention to what happened three years ago. What they are also not telling you is they tried to move into another area and we successfully resisted.

We need to go back to those orders of the Board. There are findings of fact which are important. We'll discuss those in our written submission to you. There is a trail that's very important. And the approach from the very beginning to exclude that trail, to not equip you to make this decision, to me is dead wrong. And it's not supported by the statute, and it's not the way anyone should behave, including the Division in this particular case.

So, at this point I'll thank you for your patience and close.

MR. LAURISKI: Thank you, Mr. Appel. Well, let me

say the Board appreciates the effort that you've all put into this. You have all done a fine job. There have been some tense moments, but we got through them. I think that 30 days is appropriate. Is that agreeable with everybody, to file the post hearing memoranda?

MR. APPEL: 15 pages in 30 days?

MR. LAURISKI: 15 pages in 30 days. Sounds like a sentence.

MR. APPEL: Only when you have to read them.

MR. HANSEN: Narrow it down to two pages, that's fine.

MR. LAURISKI: Seeing that there's nothing further, this hearing is concluded.

(Whereupon the matter was concluded.)

STATE OF UTAH )

COUNTY OF SALT LAKE )

I, Linda J. Smurthwaite, Certified Shorthand Reporter, Registered Professional Reporter, and notary public within and for the county of Salt Lake, State of Utah do hereby certify:

That the foregoing proceedings were taken before me at the time and place set forth herein, and was taken down by me in shorthand and thereafter transcribed into typewriting under my direction and supervision.

That the foregoing pages contain a true and correct transcription of my said shorthand notes so taken.

In Witness Whereof, I have subscribed my name this 25th day of November, 1994.

LINDA J. SMURTHWAITE
CERTIFIED SHORTHAND REPORTER